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Improvement in Machines for Sawing Staves.

The engraving gives a perspective view of a machine for sawing barrel staves invented by Charles Murdock of Ellenville, N. Y., and patented through the Scientific American Patent Agency, June 19, 1866. The machine has been in successful operation for some time, and from a specimen of its work now before us it is evident that its products are very superior. The object of the machine is to cut staves directly from the block or bolt, giving them the requisite curvilinear form from end to end and the proper transverse convexity, and finishing them in such a manner that they require no further dressing. These results are perfectly attained and the cost of manufacturing barrels greatly reduced. The products—staves—of this machine have been and still are largely used in this city for the manufacture of tight barrels.

The frame, A, which may be of any proper and convenient form and of either timber or iron, supports a vertical shaft which carries an annular, convex saw, B, driven by power applied to the pulley, C. The saw is made in sections, as seen —one being removed in the engraving—which are bolted to a disk or spider, and joined one the other by straps, D, and stiffened by rivets passing through holes in the edges of the sections, as seen at E, the holes being formed by the semi-circular appertures in the alternate edges of the sections. The disk is also made in sections for facility in transportation.

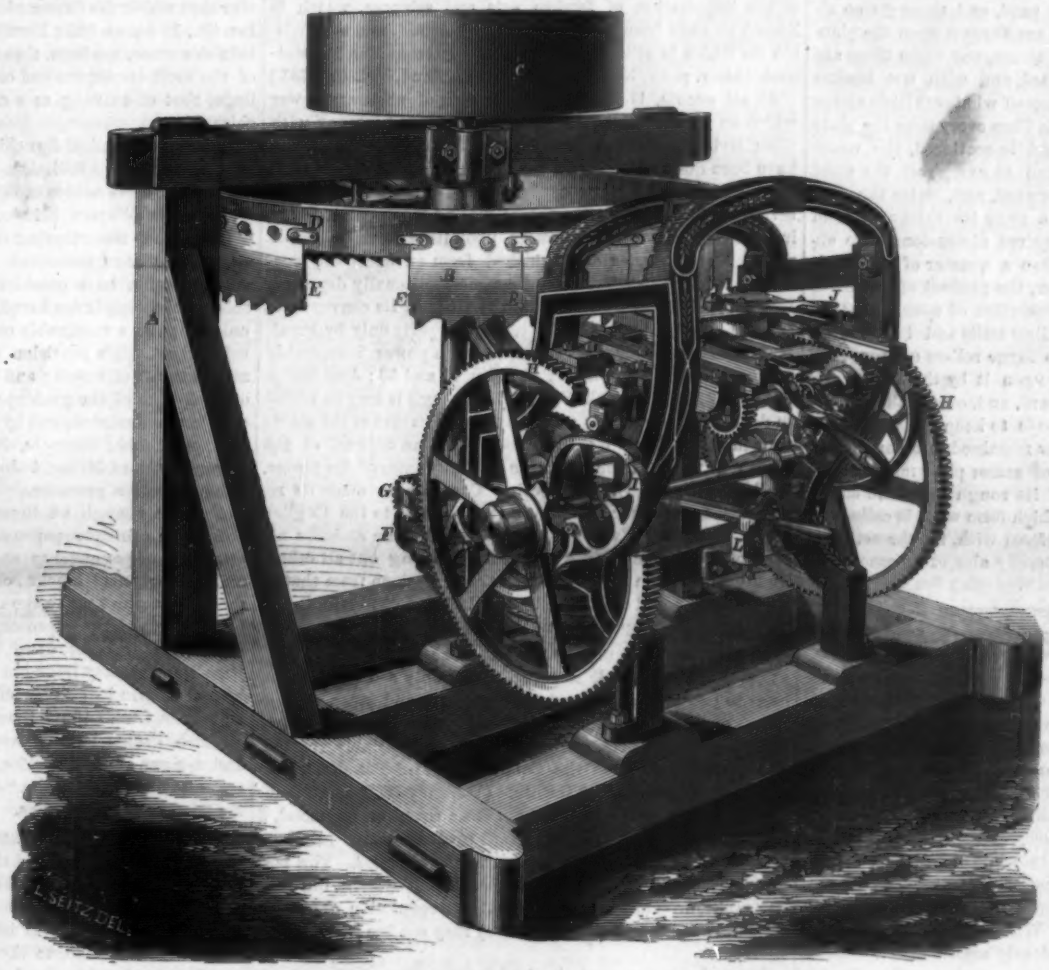
These sections of saw plate are not only bent to fit the periphery of the disk, but curved across from edge to back to suit the convexity of the cask. The diameter of the saw nearly corresponds with the sweep of the circle of which the ordinary barrel forms a segment from end to end, allowing for the spring of the stave. The saw is intended to receive adjustable teeth so that it will always preserve its depth, which is sufficient to saw the widest stave.

The vertical shaft which carries the saw has on its lower end a cone pulley, F, which drives the feed machinery. A belt connects this with a similar cone on an upright shaft that carries a bevel gear on its upper end, driving one on a horizontal shaft. This shaft carries on each end a pinion—one shown at G—which drives a horizontal shaft by means of the gears, H. On the same shaft are double cams, marked on one side, I, which raise a table the arms of which are pivoted to a portion of the iron frame extending under the front of the saw; the swing of this table being adjusted to the transverse convexity of the saw, or of the stave. The table supports a carriage, which works in slides and is moved back and forth by means of racks and pinions attached to the outer edge of the table. On the saw side of this carriage are dogs for holding the bolt to be sawed, which are moved to or receded from each other by the usual means of a pinion worked by a lever—seen at J—and parallel racks.

The pinions seen on the outside of the table and which move the carriage forward to the saw are operated automatically by the movement of the ratchet lever, K, which as the free end of the table and carriage come down after the stave has been sawed are lifted by striking against the adjustable stop, L, and thus move the carriage and bolt forward sufficiently far to present the thickness of another stave to the saw. This thickness may be adjusted to any required degree by changing the ratchet and moving the adjustable stop, L.

The lever seen near L is for throwing the feed in or out of gear. The carriage carrying the bolt may be moved forward by hand as well as automatically and by raising the ratchet lever and pressing upon the spring stop the carriage can be be easily drawn back to receive a new bolt.

With this machine all the various kinds of soft, and otherwise unavailable woods, as buttonwood, cypress, pepperidge, etc., may be cut into staves suitable for barrels for holding molasses, sirups, etc., while the hardest woods may be readily sawed, and the loss in splitting up stave bolts and dressing them be almost wholly avoided. In the upper surface of the periphery of the disk to which the saw is secured, are placed plane irons for jointing the staves and giving them the taper to form the bilge of the cask. The staves are placed in a light frame which receives the ends, and the center of the stave is sprung outward by a cam lever, when one end of the frame is rested upon hooks on the cross beam of the framing, A, so placed as to present the edge of the stave to the cutters at the proper angle for jointing. The operation is very expeditious and effective. This part of the work, however, may be performed on a machine especially for the purpose. It is obvious that several carriage or block frames may be used with the same saw at the same time, greatly increasing the effectiveness of the machine, each carriage being capable of turning out 10,000 staves per day. Further information regarding this invention may be obtained by addressing J. B. Bartlett, 289 Greenwich street, New York city.



MURDOCK'S AUTOMATIC STAVE MACHINE.

ROLLING A FIFTEEN-INCH ARMOR PLATE.

The plate was not quite ready at the time appointed, and during the short interval of delay the works were inspected. It is almost impossible to describe the aspect of Cyclopean activity which they presented. The huge space of lofty workshops, covering more than twenty-three acres of ground, were, above, all dim with smoke, below, all dazzling with the blinding glare and heat of furnaces. Everywhere ponderous flywheels were spinning round with a loud hum through the gloom, everywhere steam hammers were falling with a shock upon the solid earth that made the walls vibrate, and people near them jump under the tremendous concussion. No place seemed free from steam or flame or melted iron. The dark nooks would suddenly become bright as furnace doors were lifted and emitted their long light-looking flames of dazzling white vapor, and disgorged a mass of seething metal, which men, almost clad in light steel armor, wheeled away and shot under the steam hammers, the first stroke of which sent jets of melted iron rushing in trains of fire like meteors in all directions. Sometimes one came on groups of men who were saturating in water the rough bands of sacking in which they were enveloped before going to wrestle with some white-heat forging, sometimes on men nearly naked, with the perspiration pouring from them, who had come to rest for a moment from the puddling furnaces, and to take a long drink of the thick oatmeal and water, which is all that they venture on during their labor, and which long experience has proved to be the most sustaining of all drinks under the tremendous heats to which they are subjected. On every side the glare, the smoke, the din, and steam are alike deafening and blinding. On every side are masses of melted iron running down troughs, or great blocks of it heated to a glow that is almost melting being welded and knocked away into myriads of sparks and jets of refuse under the blows of the hammers. Most uncomfortable of all are the slabs of armor plate and blocks of steel ingots which, half cooled, and of a dull slate color, lie about everywhere. From those in a bright, red glow the visitor can guard himself, for he sees them; but from those which are partly cooled, but yet hot enough to scorch the flesh from the bones when closely approached, there is little safeguard, as one hurries out of the way of seething puddle blooms or open furnaces, which diffuse such an intense general heat around that little extra warning is given by the treacherous masses of half-cooled slabs till the danger is almost too near to be avoided. After seeing and suffering under seeing such scenes, the visitors were conducted to the armor rolling mill, where the monster plate was to be drawn. The process of drawing it is simple, but peculiar. The plate, when laid in the furnace, rests upon little stacks of fire bricks, so that the flame and heat play equally round it, till all is glowing white, and the successive layers have settled down into one dense mass. A great deal of the success depends upon the time at which the plate is drawn and the amount and length of time to which it is to be heated. All this is regulated by the chief roller and chief furnace-man, who are paid wages which many eminent professional men might envy—wages amounting from £1,200 to sometimes £3,000 a year. On Friday, as the time for "drawing" approached, these officials opened the furnace doors, and approaching close to them with only the shelter of a lump of wet rag held loosely before their arms and faces, peered into the blinding glare from time to time with as much care and apparently as much indifference as if they were looking into the tube of a telescope. Suddenly, at a signal from the furnace-man, the bands of workmen, to the number of about sixty, arranged themselves on each side of the furnace, as near to it as they could bear the heat. Then the doors were opened to their fullest, and what had been a glare before and what had been a heat were quite eclipsed by the intense light and fervency with which the long tongues of flame leapt forth. In the midst of this great light lay a mass even whiter than the rest. To this some half a dozen men drew near. They were all attired in thin steel leggings, aprons of steel, and a thin curtain of steel wirework dropping over their faces like a large long visor. All the rest of their bodies were muffled in thick wet sacking. Thus protected they managed, with the aid of a gigantic pair of forceps slung from a crane above, to work as it were amid the flames for a few seconds, and to nip the huge plate with the forceps. The signal was then given, and the whole mass of iron, fizzing, sparkling, and shooting out jets of lambent flame, was by the main force of chains attached to the steam rollers, drawn forth from the furnace on to a long wrought-iron car. The heat and light which it then diffused were almost unbearable in any part of the huge mill, but the men seemed to vie with each other to approach and detach the colossal pinchers which had drawn the iron forth. More than a dozen attempts were made on Friday before this was effected, and more than a dozen of the best and most skillful workmen were driven back one after another by the tremendous heat and glare.

At last all was made clear. The forceps, then red hot from their grip of the plate, were drawn away, the chains cleared from the rollers, and, with a great hurrah, the other workmen seized the chains attached to the iron truck, and drew it to the incline by main force, where it was left by its own weight to run into the jaws of the rolling mill. It was then *sauve qui peut* among the workmen, who rushed for shelter in all directions as the mass was nipped between the rollers, and wound rapidly in amid quick reports like those of dull musketry, as the melted iron was squeezed by the tremendous pressure out of the mass, and flew out in jets of liquid fire on all sides. In spite of all the care and all the skill which the best workmen can use on these occasions, they cannot always escape the splashes of melted iron, and the burns inflicted are numerous and often severe. The turning of the rollers crushes the plate through to the other side, where it rests for a minute on a wrought-iron truck similar to that on which it was brought from the furnace. The action of the rollers is then reversed after they have been by the action of screw levers brought closer together by about an inch. These again nip the plate and drag it back in an opposite direction, and again and again does the mass go forward and backward, each time passing between a smaller space between the rollers, till, as on Friday, the whole of the huge thickness was reduced to a compact mass fifteen inches thick, in less than a quarter of an hour. During every stage of the process, quantities of fine sand are thrown upon the plate, and this literally takes fire as it touches the flaming surface, and covers it as it melts with a coat of silica, or with a glaze like that of earthenware. After every discharge of sand, and these go on almost incessantly, buckets of water are thrown upon the plate and explode in clouds of scalding steam, and when these are partly dissipated men rush forward, and with wet besoms with handles twenty feet long sweep off whatever little scraps of oxydation may have taken place. Thus every time the plate passes through the mill the sand is scattered, the water thrown, and the surface swept, and at every roll the chief roller of the establishment runs forward, and, under the shelter of wet cloths, measures with a gage its thickness from end to end. On Friday the required dimensions were obtained, as we have said, by less than a quarter of an hour's rolling, and a plate 15 inches thick, the product of the labor of nearly 200 men and of the consumption of nearly 250 tuns of coal, was shot out by the rolling mills and left to cool. When this had been effected two large rollers of iron, each weighing 15 tuns, were placed upon it by the cranes, and moved slowly backward and forward, and, eventually, as the plate cooled, were left upon its ends to keep the whole perfectly level. Nothing further now remained in order to complete it as the finest specimen of armor plate manufacture ever attempted, but to plane off its rough ends and edges. The flat surfaces on either side, which form what is called the skin of the plate, are never interfered with, for the action of the steel rollers leaves them literally almost as smooth as plate glass.—*London Times.*

ON THE NATURE OF PROPERTY IN PATENTS.

As we investigate the history of patents, perhaps no question at once so elementary and so embarrassing presents itself as that concerning the nature of the property acquired by the holder of a patent. Its solution might furnish analogies which would turn the scale of many a well-balanced case, and the want of a ready answer has been often palpably felt and deprecated. And yet, notwithstanding the importance which seems to gather around the subject, few seem to have groped into the apparent darkness, while conjectures, often contradictory and evidently founded upon first impressions or general principles, have (when the subject has not been carefully shunned), been lightly hazarded. While one eminent jurist in this section of the country confidently asserts that a "patent is a compact, and an executory one at that, rather than a deed of property," and that "its vitality consists in making good by the patentee certain provisions which are of the character of conditions subsequent," (Betts, J., in Smith *vs.* Higgins, N. Y., 1857,) another almost at the same time and in an opposite section declares that "a patent may be considin the light of a deed from the government," conferring vested rights and present privileges. (Wilkins, J., in Page vs. Ferry, Mich. 1857). While one distinguished commentator affirms that "a patent is of a metaphysical nature, and exists merely in idea and abstract contemplation, and is in fact a naked right, which if the patent itself did not make it assignable, would be inseparable from the person of the grantee, and that it may properly be defined as an incorporeal chattel, impressed with the character of personal estate," (Hindmarch on Patents, 233,) a second learned writer on the same subject scrupulously avoids committal on this point.

We shall briefly endeavor, by tracing the rise and embodyment of property in patents, and by observing the most approved divisions of property according to its nature, to locate this seemingly wandering Pleiad in that group which its essence and incidents point out, and thus indicate some of the most obvious and generally interesting consequences which flow from its position.

The fundamental idea of a patent, aside from the incidents which the policy of wise governments have grafted upon it, is *a grant by government of the exclusive privilege of enjoyment of a new and useful manufacture.* The right to confer this privilege seems from a very early period to have been an acknowledged prerogative of the English crown. Thus in a case reported in the Year Books of Edward III., A. D. 1328, it is said that "arts and sciences, which are for the public good are greatly favored by the law, and that the King, as chief guardian of the common weal, has power and authority by his prerogative to grant many privileges for the sake of the public good, though *prima facie* they appear to be clearly against public right." (Year Book, part IV., 40 Edw. III., fol. 17 and 18.) And in the celebrated case of Monopolies arising in the reign of Elizabeth (Darcy *vs.* Allen, Noy. R., 182), it is recited that "In the time of Edward the Third some alchymists persuaded the King that a philosopher's stone might be made, and the King granted a commission to two 'fryers' and two aldermen to inquire if it were feasible, who certified that it was, and the King granted to two aldermen a patent of privilege, that they and their assigns should have the sole making of the philosopher's stone."

In the case of Darcy *vs.* Allen (supra), it was also said that "When any man, by his own charge or industry, or by his own wit or invention, doth bring any new trade into the realm, or any engine tending to the furtherance of a trade never before used and that for the good of the realm, that in such cases the king may grant to him a *monopoly patent* for some reasonable time." (See also Bacon's Abr., Title Prerogative.) From these cases and some others which could be cited, and all of which occurred anterior to the earliest English statute on the subject (21 Jac., I. c. 3), it is evident that this power of the Crown was recognized by the common law as existing prior to and aside from any statutory provision.

It is extremely probable that the exercise of this important branch of the prerogative took its rise from the farsighted policy of the Saxon Alfred, in days when the wisdom of a monarch was more potent than the venal partisanship of the "*wittena-gemote*" or Parliament, and was perhaps earliest applied, at the then low ebb of invention, to the encouragement of the importation of foreign arts and sciences, which is known to have been greatly favored by Alfred, and a provision for which is still preserved in the present English statutes. (Asser. p. 20, Hume's History of England, Vol. I., p. 767.)

At all events, it was no mere stretch of arbitrary power which an enlightened age has toned down to harmony with other civil regulations, but appears from the very first to have been designed as well for the benefit of the people at large, as for the emolument of the inventor. Taking a brief review of the definition of a patent, we find that a patent for an invention is a *grant* conferring upon its possessor a vested right of property, as distinguished from an executory contract, and of which he can not be constitutionally deprived. It is also said to be a grant from the mode of its conveyance, it being possible to convey incorporeal property only by grant. It is a grant too *by government*, under a power inseperably annexed to it (3 Shep. Abr. Prerog., p. 67 and 59; Jenkins, p. 304; Skin., 606; 1 Hawk. P. C., c. 70), though it may be vested in different departments according to the nature of the state; thus in England, as we have seen, it is an adjunct of the Crown, as the supreme executive and originator of the power, while under our own constitution Congress is made its repository, as the successor in this particular to the English kings. But it is also a government grant of an *exclusive* nature, of the character of a monopoly, shutting out all others from participation in its benefits, excluding them from that to which they would otherwise be entitled, and conferring upon its possessor appropriate remedies.

It is also in its nature a *privilege*, as distinguished from something demandable of right, and is only conferred in answer to petition, and as a matter of grace and favor, (Hindmarch on Patents, p. 4; Act 1792, sec. 1; Act 1793, sec. 1; Act 1800, sec. 1; Act 1836, sec. 6), though now invariably granted, and compellable from the Commissioner of Patents, whose duties are prescribed by statute. (Whitney *vs.* Emmet, Bald. 318; Hildreth *vs.* Heath, Ms. App. Cas.; Grant *vs.* Raymond, 6 Pet. 241.) This government grant of an exclusive privilege is also one, in general, of unrestricted *enjoyment*. The possessor is confined to no one mode of employment, but may use, make, or vend his invention without restriction, or (except in the case of a foreign inventor) may confine it wholly to himself.

That the grant must also be for a *new* manufacture, is so elementary a proposition as to need no illustration, though its full explanation may be properly reserved for the text book, and the quality of *utility* is an equally necessary and obvious ingredient, though its amount may be small (Morgan *vs.* Seward, 1 Webs. 172, 186), and ideas of its nature have been greatly modified since the early history of the grant of patents, when Lord Coke in his Third Institute of the Laws of England, recites with evident approval, "that there was a new invention found out heretofore that bonnets and caps might be thickened in a fulling mill, by which means more might be thickened in one day than by the labors of fourscore men who got their living by it, and it was ordained that bonnets and caps should be thickened and fulled by the strength of men and not in the fulling mill, for it was held inconvenient to turn so many laboring men to idleness." A decision a trace of whose spirit even at our day we see, fostered by ignorance, and cropping out at the suggestion of demagogues. To complete the brevity of the definition, the word "*manufacture*" has been held to include all of the various terms used in our patent law. (Curtis on Patents, §69.)

After this survey of the nature of the patent grant, we shall be more ready to recognize its similitude to other branches of property, and assign to it its proper station if discoverable.

All property is divided principally into two great classes, real and personal, and a third and much smaller division, partaking of the nature of both, called "mixed" property. Real property is said by the most approved text writer to consist of lands, tenements, and hereditaments; and hereditaments are further separated into corporeal and incorporeal hereditaments. The definition of real property by the word hereditament is, however, incorrect, for so far from being a part or subdivision of, or even a synonym for, real property, it is in fact a word of far wider signification, being nearly, as is said by Chancellor Kent (but with perhaps too great latitude), as comprehensive as the word property. (3 Kent Com. Lect. LII.) It however includes whatsoever may be inherited, real or personal, or mixed (1 Co. Inct. 6; 3 Kent Lect. LII.; 2 Blacks, p. 17), and as such may be applied to a mere movable chattel, such as an heir-loom. (3 Rep. 2, Norris *vs.* La Neve, 3 Atk, 82. But see New York Code of Procedure, sec. 462.)

After separating hereditaments into those of a corporeal and those of an incorporeal nature, our authorities further distribute incorporeal hereditaments, which are defined to be rights issuing out of or annexed to things corporate, into classes, among which we find "commons, ways, offices, franchises, pensions, annuities, and rents." Of these subdivisions, it is submitted that that of "*franchises*" includes our subject matter, and if its essential qualities appear the same, must of necessity carry with it by analogy its incidents and liabilities.

As we trace the adjudged qualities of a franchise, we meet at every step the characteristics of our modern Letters Patent, as we have heretofore traced their nature. "A franchise or freedom," says Sir William Blackstone, "is a royal privilege, or branch of the king's prerogative, subsisting in the hands of a subject" (2 Blacks. 37; Finch 38, 164-6; 3 Cruise, Dig. 278, tit. 27, sec. 1; People *vs.* Utica Ins. Co., 15 Johns. 386), and must arise by grant from the Crown. (*Id.*) This quality we have already traced in the rise and progress of patents. (To be a corporation is a franchise, as is also to have treasure trove, deodands, or the right to take tolls, etc.) It seems, too, that the words "Royal privilege" are to be used in an objective as well as a subjective signification, and to include not only that which the Crown can alone primarily enjoy, but also that which the Crown alone can grant. (People *vs.* Utica Ins. Co., 15 Johns. 386; Burrill Dic. Tit. Franchise). And it is in this sense, perhaps, that the patent right as well as one of the most important and common of royal grants of privilege, that of existing as a corporation, is said to be a franchise.

The same identical franchise can not be granted to more than one person (2 Roll. Abr. 191, Keilw. 196), and herein we see the exclusive nature of the patent. (But see case of Chas. R. Bridge *vs.* Warren Bridge, 11 Pet. 420, a decision which seems rather the offspring of modern necessities than the strict adherent of precedent. See opinion of Story, J.)

There must be a consideration for the grant of a franchise in the benefit conferred on the public or otherwise, for unless it has a reasonable commencement it is illegal and void (2 Inst. 22), a provision evidently corresponding to the requirements of novelty and utility in a patent. The mode of protection of the grantee of a franchise is by action on the case for the invasion, and by injunction (22 Henry II., 146; 2 Roll. Abr. 146; Tripp *vs.* Frank, 4 T. R. 666; Newburgh Turnpike Co. *vs.* Miller, 5 Johns. Ch. R. 111), the well-known safeguards of a patentee.

A patent, though an incorporeal hereditament, is however strictly on principle personal property, having none of the attributes of permanency and immobility which characterize real property. (2 Blacks., ch. II., p. 15.) Nor does the fact that our statutes make the rights conveyed decensible to the heir instead of the executor (Act of 1836, sec. 5) render this any the less true, for, as we have already seen, an incorporeal hereditament may issue out of or be annexed to chattels, and be real only in its quality of descent. (3 Rep. 2; 1 Co. Inst. 6; 3 Kent Lect. LII.; 2 Blacks. 17; but see code, §462.) The English grants indeed name the executors, administrators, and assigns of the inventor, but this seems to have been an engrafted quality, for the "inventor" alone is mentioned in the Statute of Monopolies. (21 Jac. 1, c. 3, sec. 6.)

We submit, therefore, that the property acquired by letters patent for an invention, in this country at least, may be defined to be an incorporeal hereditament, called a franchise, of a personal nature, for it consists of rights issuing out of and annexed to the corporeal letters patent or grant of the government, decensible to the heir, and joining to the origin, consideration, nature, and exclusiveness of a franchise, the mobility of personal estate, and we therefore proceed to trace some analogies between it and kindred branches of property.

Shares in the franchise of an incorporated company are incorporeal hereditaments, each shareholder being said to hold a franchise (2 Blacks., p. 37), and, like the patent privilege, some of these have been held to pass to the heir, and in that particular partake of the character of land. (Dryteutter *vs.* Bartholemew, 2 P. Wms. 127; Buckridge *vs.* Ingraham, 2 Ves. Jr. 651; Price *vs.* Price, 6 Dana, 107.) Yet it is perhaps better to consider them as of the nature of a transmissible and assignable franchise of the personal kind. (Judge Sharswood, Notes to Blackstone, Bk. 2, p. 15, n. 1.) As a general thing, however, in established companies they superadd the character of evidences of debt, which is not to be confounded with their primary nature.

Perhaps the most striking parallel to the conjunction of the inheritable characteristic of real property with personal property is to be found in the case of an annuity granted to a man and his heirs, but chargable only on the person of the grantor, and in the analogous English property in a "corody." An inheritable annuity (not charged on lands) is said by Lord Coke to be a fee simple *personal* (Co. Litt. 2 a.), and though it is forfeitable for treason as a hereditament (7 Rep. 34 b), yet it is not a hereditament within the statute of mortmain (7 Edw. I. st. 2; Co. Litt. 2), and is not entailable. (Case of the Earl of Stafford *vs.* Buckley, 2 Ves. Lr. 170.)

The right to take tolls, another incorporeal hereditament, may be likewise mentioned as an analogous class of property, especially in the mode of its enjoyment (Vose *vs.* Singer, 4 Allen, 226), for as patents are often made profitable by the imposition of a royalty, this royalty is in the nature of a toll for the use of the patent.

There is perhaps some faint analogy, too, between a patent right and a right of way, for it is an exclusive right of way

in the region of invention secured to one for a limited period as a compensation for having first discovered it, (Vose vs. Singer, supra), something in the spirit with which Spanish arrogance once interdicted traffic with the new-found world

It would be impossible, however, within the scope of this article to do more than locate in its proper family this species of property, leaving to the keen decision of practical test the determination of the names and nearness of its kindred. If we have at all resolved intricacies pertaining to the subject, and at least pointed out the paths to further illustration, our immediate object will have been attained, and we shall leave to ampler time the consideration of the numerous incidental questions to which the main interrogatory has given birth.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Galvanic Battery.

MESSRS. EDITORS:—I have been shown a back number of your journal containing a letter from Mr. M. G. Farmer in which he ably and clearly shows that the cheapest source of powerful electric currents of large quantity and intensity is mechanical force, in other words, coal or solar force.

In his letter he makes the following remark: "It is well known that a galvanic battery will perform its maximum work when the external resistance which it encounters is equal to the internal resistance of the battery."

This statement is approximately correct and would be strictly—mathematically—correct did the electromotive force of the battery remain constant. Unfortunately many students draw a wholly wrong conclusion from the above statement which is derived from Ohim's "Theory of Electricity."

I have found when in conversation with many on both sides of the Atlantic that a very general impression prevails that for telegraphic and almost all other purposes the best and most economical results are obtained when the internal and external resistances are equal. That this is not the case will be evident by referring to Ohim's law, viz., "If the electromotive force of the battery be E, the resistance of the battery be B equal internal resistance; the resistance of the circuit, R equal external resistance; the quantity of electricity in motion through the battery and circuit equal Q, then the value of Q will be $\frac{E}{B+R}$

Now if B equal R it is evident that half the work of the battery is expended in overcoming the resistance of the battery itself, producing useless heat, the other half only being available for actual work. If now the question be put "how can a given quantity of zinc and acid be made to produce the maximum amount of external—that is useful work?" it will at once become evident that could the resistance of the battery equal B be reduced to nothing the whole work would be expended in R; in other words could the resistance of the battery be got rid of entirely the whole, that is twice the amount of external work would be produced from the same amount of zinc that was possible when the external and internal resistances were equal. Therefore, in all cases, the resistance of the battery itself should be but a small fraction of the total resistance of the circuit in order to work economically.

There is, however, another reason why the latter should be the case. When a battery works hard the solution near the negative plate is reduced in strength by the decomposition going on and the result is a decrease of electromotive force so that E ceases to be a constant quantity in the above equation.

The variation of E is different in different batteries and the result is that with a Daniel's battery 50 cups whose total resistance is one-twentieth part that of the circuit will produce as much current as 100 cups whose total resistance is equal to that of the circuit. In the former case the consumption of zinc and sulphate of copper will be just one-half that in the latter (local action or waste being excepted.)

The resistance of a telegraphic circuit is varying continually by defective insulation and change of weather, consequently in wet weather when the greatest current is wanted the resistance of the line or circuit is at its minimum and therefore if the battery's resistance be a large fraction of that of the circuit at the very time when the most power is wanted a larger portion than usual of the battery's force is expended in itself. Hence great variability of currents in the circuit.

In conclusion the best, most regular, and most economical results are obtained when the internal resistance of the battery is very small compared to that of the external resistance.

CROMWELL F. VARLEY.

Chicago, Sept. 20, 1867.

Case Hardened Iron as Steel.

MESSRS. EDITORS:—Is there any invention or process patented by which iron, by the simple process of case hardening, can be made to answer all the advantages that steel has over iron in a mechanical sense?

I claim to take a piece of good iron and case harden it, and it shall work under the smith's hammer the same as steel, and shall bear annealing, working, and hardening, the same as steel, and do all that steel can do in the form of taps, chisels, hammers, punches, files or any other article that steel is used for.

F. C. CURIE.

Lancaster, Pa.

May not our correspondent use the term case hardening for that of converting or cementation? Case hardening, in its results, is, chemically and practically, the same as the ordinary method of converting iron into steel, only not carried so far. The outer portion of the iron, in case hardening, becomes steel, frequently to a measurable depth. If by a quick process of case hardening or converting our correspondent can make good steel from good iron, it ought to be valuable. It is well known that a thin piece of iron, or a small iron wire, can be converted by the process known as cementation. It is quite common among machinists to make large taps of wrought iron, and after they are finished, to case harden them, when, if properly done, they work well.—[EDS.

Lightning Conductors.

MESSRS. EDITORS:—Not having been able to be more than an occasional reader of the SCIENTIFIC AMERICAN, since the collapse of our cause, my attention has not been heretofore called to your article on "Lightning Conductors," in Vol. 16, No. 20, May 18, 1867. As it inculcates an error which is of some practical importance, I beg leave to make the correction.

Speaking of metals, you remark: "The conducting power lies in the surface; a tube is as efficient as a solid rod of the same diameter, and a strip or ribbon, which presents the same amount of surface, is equal in power."

Now, the opinion that the conducting power of metals for electricity is proportional to the extent of surface, is a common popular error. The numerous itinerant lightning-rod men, who perambulate the "area of freedom," are always fortified with certificates perpetuating this physical error. I cannot imagine how such a mistake originated, unless the law of distribution of statical electricity on conductors has been confounded with their conducting power.

No law of electricity is better established, or rests on a more secure experimental basis, than that, for any given metal, the conducting power varies directly as the area of a cross section, and inversely as the length; or, otherwise, conducting power varies as $\frac{\text{Area of cross section.}}{\text{Length.}}$

For the experimental proofs of this law I refer to any of the standard treatises on electricity, as De la Rive's or Becquerel's.

The same law is true, as might have been expected, for Voltaic electricity. In fact, Ohm's law, and the formula which is founded on it, express the same truth. In this form, the accuracy of the law has been tested in the most rigorous manner.

The practical bearing of this law is obvious, as well as important. The "ribbon form" of conductor, which you recommend, will not answer; for the amount of metal, or area of cross section, would not be sufficient. Even your "copper ribon" would, probably, be fused and dissipated under an ordinary stroke of lightning. The rod must have metal enough to carry the electricity; we gain nothing by spreading it out, or otherwise augmenting its surface.

I was glad to see that you exposed the popular fallacy in relation to "insulating the conductor from the building." These glass and horn insulators are totally useless. Those who may be disposed to reject this opinion, will, nevertheless, appreciate the fact, that, when such insulators become wet, they are conductors, and are practically inoperative.

The influence of length on the conducting power, as indicated in the law above given, shows the importance of having the rod as straight as possible; for any increase of length diminishes its conducting power, and, consequently, its efficacy. For the same reason, very long rods should be larger than short ones.

ELECTRON.

Science Familiarly Illustrated.

THE ART OF BALANCING.

The feats of skill performed in the circus, which in our boyhood excited our wonder and caused us to regard the actors as beings of a superior order, in after years may be legitimate subjects of study to the thinking mind. Look at the balancing performances. They appear wonderful. One of the "artists" gives a plate a twirl by the hand, throws it whirling into the air, catches it on the point of a sharpened stick, places the other end of the stick on his chin and balances it; then taking up another he repeats the process until he has perhaps six or seven spinning and balancing on head, face, and hands. Another climbs a pole and suspending himself on the top, his body horizontal, another carrying the pole and performer about, accurately keeping the equilibrium of both. Another performer walks erect on a tightened rope or wire, controlling his perpendicular and governing his progress by means of a long pole carried transversely across his body, thus sustaining himself on his narrow base by what is termed the equilibrium of forces. The "flying trapeze" is another exemplification of the art of balancing. The performer requires some judgment, a quick mechanical eye, but mostly constant practice.

Now all these public performances of professionals are equaled, if not surpassed by the successful efforts of the infant just learned to walk. A child of one year old who can just "toddle" about the room, unaided by chairs or the hands of its parents, gives a performance not in any way inferior to that for which people pay their money to witness. Think for a moment what practice—the exercise of judgment and the teachings of instinct can hardly be predicated here—is required to balance a top-heavy weight elevated so high—proportionally—from the base and that so small, and not only this, but to change from one base, or foot, to another rapidly, preserving meanwhile the center of gravity! It is as though a tall tower should be balanced alternately by its base on one side and then the other; and more than that, it has to adapt itself to inequalities of surface and move from one point to another. The slightest excess of momentum by the push or thrust of one point of support, would, according to the laws of mechanics, topple the whole structure over, and the line of gravity, passing beyond the base it would inevitably come disastrously to the earth. Yet in the case of the infant just beginning to walk—of course entirely ignorant of the laws of gravitation—the slight practice to which it has been subjected proves sufficient for it to rival the performances of those who "astonish the natives" in public entertainments.

With all our knowledge of mechanical contrivances, we have never yet succeeded in reproducing this alternate balancing in mechanism. The walking doll is a very clumsy imitation, or simulated attempt at the ordinary process of walking, so common that we do not notice it. When machinery, built of rigid metal, can be made to imitate, successfully, the ordinary movements of the animal organism, we may consider a new door opened to mechanical inventors, but it is doubtful if we shall ever arrive at such a stage of mechanical perfection as this.

Concerning Man.

Wonders at home by familiarity cease to excite astonishment; but thence it happens that many know but little about the "house we live in"—the human body. We look upon a house from the outside, just as a whole or unit, never thinking of the many rooms the curious passages, and the ingenious internal arrangements of the house, or of the wonderful structure of the man, the harmony and adaptation of all his parts.

In the human skeleton, about the time of maturity, are 165 bones.

The muscles are about 500 in number.

The length of the alimentary canal is about 22 feet.

The amount of blood in an adult averages 30 pounds, or full one-fifth of the entire weight.

The heart is six inches in length and four inches in diameter, and beats seventy times per minute, 4,200 times per hour, 100,800 per day, 36,772,000 times per year, 2,565,440,000 in three score and ten, and at each beat two and a half ounces of blood are thrown out of it, one hundred and seventy-five ounces per minute, six hundred and fifty-six pounds per hour seven and three-fourths tuns per day. All the blood in the body passes through the heart in three minutes. This little organ by its ceaseless industry,

In the allotted span
The Psalmist gave to man,

lifts the enormous weight of 370,700,200 tuns.

The lungs will contain about one gallon of air, at their usual degree of inflation. We breathe on an average 1,200 times per hour, inhale 600 gallons of air or 24,400 gallons per day. The aggregate surface of the air cells of the lungs exceeds 20,000 square inches, an area very nearly equal to the the floor of a room twelve feet square.

The average weight of the brain of an adult male is three pounds and eight ounces, of a female two pounds and four ounces. The nerves are all connected with it, directly or by the spinal marrow. These nerves, together with their branches and minute ramifications, probably exceed 10,000,000 in number, forming a "body guard" outnumbering by far the greatest army ever marshaled!

The skin is composed of three layers, and varies from one-fourth to one eighth of an inch in thickness. Its average area in an adult is estimated to be 2,000 square inches. The atmospheric pressure being about fourteen pounds to the square inch, a person of medium size is subjected to a pressure of 40,000 pounds! Pretty tight hug.

Each square inch of skin contains 3,500 sweating tubes, or perspiratory pores, each of which may be likened to a little drain-tile one-fourth of an inch long, making an aggregate length of the entire surface of the body of 201,166 feet or a tile ditch for draining the body almost forty miles long.

Man is made marvelously. Who is eager to investigate the curious, to witness the wonderful works of Omnipotent Wisdom, let him not wander the wide world round to seek them, but examine himself. "The proper study of mankind is man."—*Cin. Journal of Commerce.*

Burns.

In regard to the treatment of burns there is a great diversity of opinion, scarcely any two surgeons agreeing as to the remedies. All of them are doubtless valuable, but there is one which has a great reputation, carron oil, limewater, and linseed oil. The great objection to it is its offensive odor, rendering an entire ward disagreeable. When the burn is very superficial, simply inflaming or vesicating the part, covering it up with flour, and then placing a layer of cotton over it so as to exclude the air, makes a very comfortable dressing. Another method consists in applying cold water, and another warm water covered with oiled silk and a bandage. Lard, deprived of salt, and simple cerate make pleasant applications. The profession is indebted to Prof. Gross for the introduction of white lead and linseed oil in the treatment of burns. It is one of the very best applications which can be used, effectually excluding the air, and being always grateful to the patient. In all cases, no matter whether merely the skin or the deeper structures are involved, white lead rubbed up with linseed oil to the consistence of paste or paint, and placed on with a brush, will be found productive of great relief. There does not appear to be any risk from the constitutional influence of the lead, though it has been suggested, to counteract any tendency of this kind, that the patient should take occasionally a little sulphate of magnesia.—*Medical and Surgical Reporter.*

EXTRAORDINARY COINCIDENCES.—The diameter of the earth multiplied by 108 gives the diameter of the sun; the diameter of the sun multiplied by 108 gives the mean distance of the earth from the sun; and the diameter of the moon multiplied by 108 gives the mean distance of the moon from the earth.

Hand Pump for Dwellings, Manufactories, etc.

The peculiarity of form of this pump is noticeable; its simplicity of construction and directness of action are not less conspicuous. Fig. 1, of the accompanying engravings, shows the outward appearance of the pump as ready for use; and Fig. 2 is a vertical, longitudinal section, exhibiting the working parts. A is a cylinder open at both ends, having on two sides chambers, B and C, also open at both ends, all cast in one piece, and having heavy projecting flanges, as seen plainly in Fig. 1, to which are bolted the heads, D. Between the flanges of the heads and cylinder are introduced glands of thick rubber, which serve as packings. At the openings between the chambers and the heads, this rubber is cut on three sides, leaving the upper side uncut, thus forming flap-valves which are weighted with metal plates attached in the induction set, E, at the bottom, on sides opposite to those of the delivery valves, F, at the upper side of the cylinder. G, Fig. 2, is the inlet pipe; and H, both figures, is the pipe leading to the air chamber, I, from which the delivery pipe, J, is conducted. The upright lever, K, is used to work the piston. The stuffing-box, L, through which the piston rod moves, is provided with a lubricating receptacle to insure ease of working. The arrows, Fig. 2, show the direction of the current, and sufficiently explain the operation of the pump.

Fig. 1

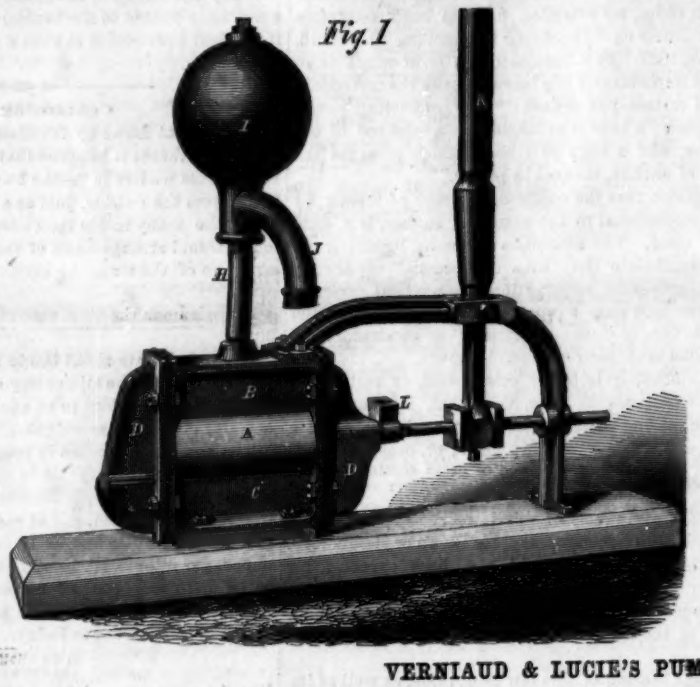
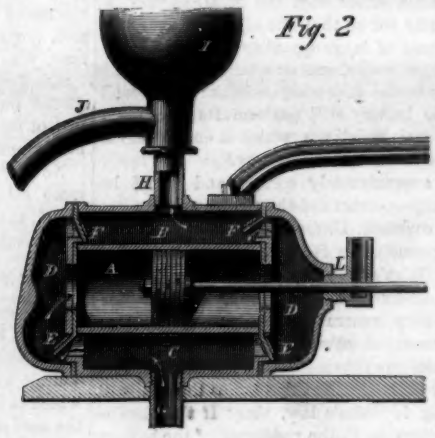


Fig. 2



VERNIAUD & LUCIE'S PUMP.

It is in use in dwellings and manufactories with satisfactory results. The inventor says that a hotel in Quincy, Ill., is using it, and the water is raised from cisterns and forced to the fifth story to be distributed over the house. It throws water seventy-five feet, easily, and is thus valuable as a means of putting out an incipient fire. It is evident, from its plan of construction, that it is easily worked, and is efficient in operation.

This pump was patented through the Scientific American Patent agency, August 20, 1867, by C. Verniaud, & D. J. Lucie, of Quincy, Ill., where they may be addressed for the sale of the right for the United States, excepting Illinois and Missouri, or for rights to manufacture and sell.

Miner's Patent Street Lamp.

It is singular that while so much attention has been given to new designs for chandeliers, pendants, brackets, etc., to be used indoors, but few attempts have been made to improve the appearance or increase the usefulness of our street lamps.

The pattern now used is the same employed ever since the first introduction of gas. The engraving, however, presents a view of an improved lamp for this purpose. Its beauty of form is apparent at a glance, and its superiority in other respects to the old style can be easily demonstrated.

It has a metallic dome of ornamental form, capped by a handsome chimney, the whole supported on four small rods of iron by which it is secured to the lamp post. The glass is made with an outward projecting flange at its top by which it is suspended in the dome. The dome projects beyond the glass to protect it from rain and snow, and the under side of this projection is painted or enameled white to better reflect the rays of light. The gas burner passes slightly through an aperture in the bottom of the glass and the gas is lighted through this hole. The dome is hinged on one side so that it may be turned over, exposing the glass for purposes of cleaning, etc.

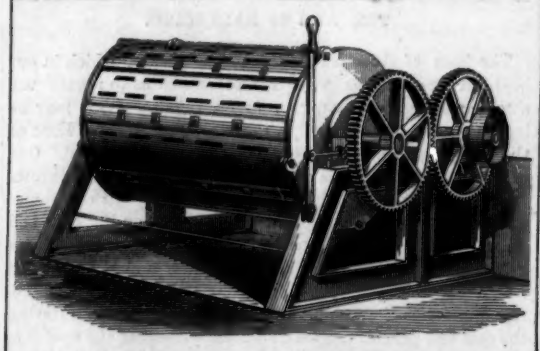
It is evident that this form of glass is stronger and is less liable to be broken by a blow than a flat pane, and it being globular will assist in dispersing the rays of light. No obstruction is offered the light except the slight rods which support the lamp. We should judge it might be furnished considerably cheaper than the lantern-like boxes now in use. Specimens may be seen lighting the entrances to the American Institute Fair, Fourteenth street, every evening, and they are to be on the Prospect Park in Brooklyn.

The lamps and State and County rights may be obtained of the inventor and manufacturer, J. G. Miner, Morrisania, Westchester Co., N. Y.

Horton's Improved Founder's Mill.

Founders, or molders, know what a trouble it is to separate the *debris* of the furnace, or, rather, the cupola; that is to separate the unfused portions of the metal from the fuel. For this purpose tumbling machines, or rotating cylinders, are used. Usually they are made of heads and staves, both of iron, and the apertures for delivering the unconsumed products of combustion are formed by openings made by cutting away in casting, a portion of the stave at what are judged proper distances, allowing these openings, which are made on the edges of the staves, to gradually enlarge. In mills so constructed, after using a short time, the staves become loose, the openings become wider, and, before long, "washing" has to be resorted to.

In the machine shown in the engraving the apertures for the escape of the dust—the *detritus*—are made through the staves themselves, and are contracted from the outside to the



inside of the staves, so that if the outside of the apertures are of sufficient area, the *detritus* may pass through them for a long time before the inside will be worn sufficiently large to necessitate a repair in the mill. This mill is built wholly of iron, and heavily geared, so that but little power is required to drive it. It was patented September 11, 1866, and gives excellent satisfaction wherever used. It is built by the Peekskill Manufacturing Company, who may be addressed at Peekskill, N. Y.

A New and Brilliant Light.

Some months ago Professor Frankland gave a particularly interesting series of lectures "On Coal Gas," at the Royal Institution, in the course of which he made some very important statements which, if corroborated by the results of future experiments, will revolutionize existing ideas as to the source of light in ordinary flames. Some of Dr Frankland's experiments are of the deepest interest, and deserve our attentive consideration as photographers.

In the course of his lectures Dr. Frankland soon falls foul of the generally received explanation of the source of light in the combustion of an ordinary gas flame. We all know that the prevailing idea is that the luminosity of the flame of common coal gas is altogether due to the liberation of solid particles of carbon in the flame and their subsequent ignition. The light, then, is the result of the incandescence of *solid* matter, and not of a gas. On the contrary, Dr. Frankland asserts that the luminosity of these flames is due to the ignition of *gaseous* and not solid matter. This novel view is supported by a number of very striking and important experiments, into the details of which we shall not now enter; suffice it to say that the learned Professor's object was in every case to obtain a highly luminous flame, which could not, by any possibility contain solid matter in a state of intense ignition. In pursuing this search he has been most successful, and found not only what he wanted, but has drawn attention to a method of producing a flame of high photographic power. This we have experimented with, and will now describe the method which we have found most suitable and convenient for its production.

When bisulphide of carbon is warmed so that it freely gives off vapor, and then is ignited, it burns with a pale blue flame, giving but very little light. If now a jet of the gas, which we obtain by the action of nitric acid on copper filings, be allowed to play through the burning vapor, a brilliant and intense bluish light is obtained, almost rivaling the magnesium light in power, but much more bearable by the eyes than the latter. We need scarcely remind our readers that the gas above alluded to is the peroxide of nitrogen, which is very easily made and preserved. We may now mention a method which we have found very useful for the production of the light on a very small scale.

A light bottle is taken, of about a pint capacity; it is fitted with a cork through which passes a glass tube. The latter is bent to a right angle a little above the cork, the free end is drawn out so as to form a tolerably fine jet, and this extremity of the tube for about four or five inches from the end is bent like the letter U, the jet looking directly upwards. The only other essential vessel is a test-tube or narrow beaker, into which the U-tube can easily dip. When we wish to procure the light, fragments of copper—either plate or wire—are placed in the bottle, and a mixture of one part strong nitric acid and two of water, poured in; the cork carrying the glass tube is then replaced, and the bent portion of the latter is allowed to dip into the little beaker, which has previously been placed in a vessel of warm water. As soon as gas comes off freely through the jet, some bisulphide of carbon is poured into the beaker. The hot water with which the latter is surrounded quickly vaporizes the bisulphide; when set fire to, this burns at the mouth of the beaker with its usual blue lambent flame, but from the gas jet, upwards, for an inch or more, according to the pressure, a brilliant cone of light arises, which is possessed not only of great illuminating power, but also of very considerable chemical energy. Of course this flame can be kept up until the gas ceases to be evolved from the copper and nitric acid, or until the bisulphide of carbon has been used up. It is necessary to observe that the current of gas should always be tolerably rapid, and the bisulphide well heated in order that the best effects may be obtained.

Bisulphide of carbon, when burning, gives off abundance of fumes of sulphurous acid, and it is advisable to have the vapors from the jet carried away by a little extemporized chimney. With this precaution there need be no trouble experienced.—*British Journal of Photography.*

Intensifying Negatives by Chloride of Gold.

Use a collodion with a good body; let the bath be perfectly free from organic matter, and make the iron developer with—

Sulphate of iron	20 grains.
Malt vinegar	60 minims.
Distilled water	1 ounce.
Alchohol	*quant. suf.*

I prefer malt vinegar to acetic acid, as by its use in the developer the latent image is brought out gradually, and with much greater intensity than with the usual formula.

If the above conditions be complied with, and the proper exposure given, a vigorous negative will in most cases be the result, requiring only a little intensification to fit it for the production of prints.

To make the gold solution, dissolve one grain of chloride of gold in a pint of distilled water, and keep this as a stock solution, from which pour a small portion into a small wide-mouthed bottle for use. After fixing and thoroughly washing the negative, allow it to drain for a few seconds; then, with a steady sweep, pour on sufficient of the gold solution to cover the plate. The color of the deposit will be observed to change from the grayish white of the iron-reduced silver to a slate color, increasing in intensity as the operation is prolonged. If great density be required, as in copying prints, etc., the solution may be used stronger. The same quantity may be used again and again, till its strength is exhausted.

If photographers will give this method a fair trial, pyro. and silver, bichloride of mercury, and the troublesome ferro-gelatine will soon be looked upon with but little favor, and the two former be reserved for extreme cases only. Among

the many useful qualities of this intensifier there is one particularly deserving a few words of comment.

It is confessedly a great drawback in negative portraiture that neither the artist nor the sitter can judge exactly to what extent a portrait is successful, or pleasing—which is much the same thing—until a print has been taken. Viewed by reflected light, a properly exposed negative is a very ghastly affair, with nearly all the shadows and half tones that constitute a picture absent; and, seen by transmitted light, little else than its technical qualities can be judged of.

It often happens that the sitter will insist on seeing his or her portrait in its embryo condition; and, if the sitter be a lady, the general exclamation will be, "What a fright!" expressed in various terms, according to the habits or education of the individual; while the more timid will inquire, with the deepest anxiety visible on their countenances—"Why, what have you done with my eyes, nose, mouth," etc.? The artist, of course, explains that everything will be found in its proper place in the finished picture; but an incredulous shake of the head is often the only reply.

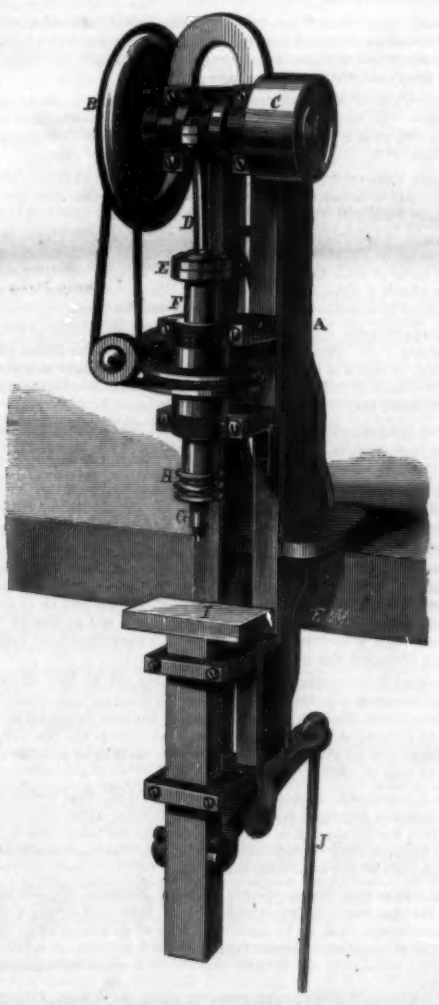
Now, by using the gold intensifier, these features can be rendered perfectly visible in the negative with the minutest details, and the most delicate half tones rendered with a distinctness equal to that in a properly exposed position.

To obtain this result, it is only necessary to watch the back of the negative, as the intensification proceeds, till the desired clearness be produced. At this point it may be stopped, if it be considered desirable to show the negative to the sitter.

In many cases, where the person is leaving the place, and a second sitting is impossible, it will be a great advantge to submit the picture for approval, and, if very favorable, a large order may be the probable result. I am certain that many of the annoyances that the poor photographer has quietly to endure may be avoided by using this process; and of this I am certain, that it needs only a fair trial to become a general favorite.—GORDON RAMSAY.—*Br. Jour. Phot.*

ADT'S ROTARY RIVETING MACHINE.

The art of using the hammer is one that takes nearly if not quite as long to acquire as that of handling the file. In



"chipping" with cold chisel, striking on the anvil, and riveting at the block or vise, long practice, combined with good judgment are necessary to successful performance. In this last operation the operator with the hand hammer meets with frequent difficulties. If the rivet end is in a recess of the work much skill is required in using the riveting hammer and adjusting the work to the successive blows.

The object of the little machine represented in the annexed engraving is to provide an efficient riveting hammer worked by power and adjustable to all descriptions of jobs. It gives not only powerful blows, but the hammer is made to rotate so that without moving the work the hammer may consecutively strike every portion of the rivet end. A brief explanation will render these statements perfectly clear.

The frame, A, is of cast iron securely bolted to a bench. At the top is a horizontal shaft carrying at one end a fly wheel, B, and at the other end a driven pulley, C. In the center, between the bearings, is a crank of short stroke, to which is attached a pitman, D, connecting at its lower end by a ball and socket joint in the gland, E, with a vertical reciprocating tube, F. Inside this tube is a rod, the lower end seen projecting at G, which is the hammer proper. Between its upper end and the closed top of the tube is a stiff spiral spring, and at its lower end a similar spring, but weaker, which bears at one of its ends on a shoulder on the hammer rod and at the other on the nut, H, which confines the rod inside the tube. This rod at its lower end is either squared or flattened to fit to a corresponding opening in the tube, F, that it may turn with the tube. Surrounding the tube, F, between its bearings, is a sleeve carrying a grooved pulley. This sleeve has a longitudinal, vertical slot on its inner surface or bore, in which plays a feather belonging to the tube, F. A belt leads from the grooved pulley over guiding pulleys to a small grooved pulley on the horizontal shaft carrying the two wheels, B and C. It is evident that as this shaft is rotated the tube, F, will rise and fall, and at the same time, through the medium of the pulleys, belt, and the sleeve, the tube and hammer rod will be rotated, so that each repeated blow of the hammer will strike in a different position relative to the work.

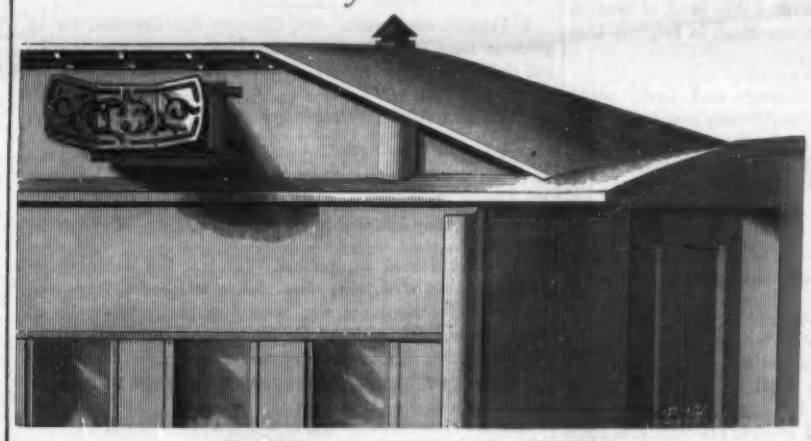
The table, I, moves in guides attached to that portion of the frame extending below the level of the bench and is elevated or depressed by means of a treadle connected to the rod, J. On this table—which may be of any form to suit the work—the job to be riveted is placed, and the power applied to the pulley, C, when the foot guides the table, I, by means of the treadle, and the blow is thus graduated. The springs inside the tube govern the action of the hammer and produce a springing blow, while the hammer slowly rotates around the point to be riveted. This device can easily be adaptad to be used horizontally as may be readily seen by the practical workman.

For this device letters patent were issued through the Scientific American Patent Agency May 22, 1866, to John Adt. Inquiries relative to the invention may be made of J. Adt and Karrman Machine Company, Wolcottville, Conn.

Apparatus for Ventilating Railway Carriages.

Among the annoyances—if not belonging to the dangers—of railway travel, is the inefficient or rather the improper ventilation of the carriages. The plan represented in the accompanying engravings may be said to be partly automatic in its action and partly arbitrary. It can be easily regulated and is entirely under control. Fig. 1 shows the side of a car of the "monitor" or raised roof style, with the ventilator attached to the side of the raised portion. Fig. 2 is an exterior enlarged view of the ventilator with the guard, seen in Fig. 1, removed. Fig. 3 is a view of the ventilator, taken from

Fig. 1.

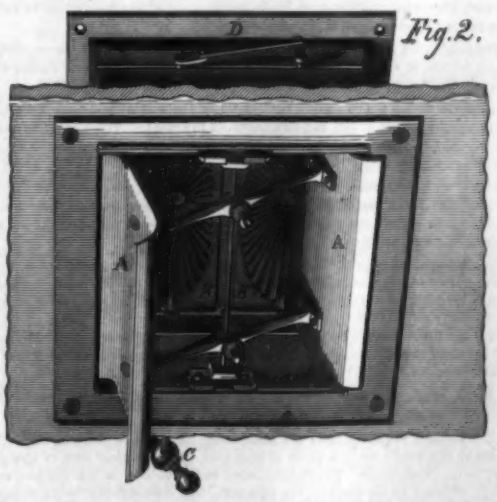


HARDY'S PATENT CAR VENTILATOR.

the inside of the car, showing the register, the two leaves of which are opened or closed at will by a handle.

The guard or outer case is of such a form as to present to the atmosphere, in whichever direction the car may be moving, a wide and somewhat funnel-shaped mouth, through

Fig. 2.



which the air rushes with a force commensurate with the velocity with which the car is moving. But such a draft, if allowed to rush into the interior of the car, would speedily in a cool day, make the vicinity of the ventilator unbearable. But the ventor or deflector seen in Fig. 2 throws the current of external air against the outside of the case or guard on the side opposite to the incoming air. If then the register leaves are turned to open a passage to the interior of the car, the draft will speedily discharge the vitiated air in the car and keep it pure. A, Fig. 2 are the vanes of the deflector, and B, same figure, the leaves of the register on the inside of the car. The register is governed in the usual manner by the handle, C. Similar letters refer to corresponding parts in Fig. 3. The cranks and connecting bar between the two leaves of the register are seen at D in Fig. 2. The vanes of the deflector are balanced and so arranged that when either mouth of the guard may be presented to the wind coming from the direc-

Fig. 3.

tion in which the car is moving, the current will close one of the vanes and thus force the other out into the guard. They will thus be held in position, and so long as the car is moving in one direction, induce a current from the interior of the car in the other direction. If no ventilation is desired, the register may be kept closed.

For sleeping cars such a ventilator is very desirable, as it provides for purity of atmosphere in the car while all incoming drafts are prevented. For this device letters patent were granted May 20, 1866, to George Hardy, 43 Turnpike street, of South Lawrence, Mass., who may be addressed relative thereto by those interested in building or running cars, whether steam railway or street railway.

Electric-Distance Meter.

The collection of articles sent to the Paris Exhibition by the Austrian War Office contains an ingenious apparatus, invented by M. C. Cocxicaka, captain in the corps of engineers, for measuring the distances and indicating the movements of distant objects. This apparatus requires two points of observation placed at a certain measured distance from each other, and connected by a telegraph wire. At each of these stations a telescope is used for observing the object in view, and below the telescope a small table is placed in one of the stations, representing the map of the space in front of the observer. At one fixed point upon the table exactly below the axis of the telescope there is a long thin needle balanced upon a point, and connected to the telescope, so as to follow all movements of the latter and to be always parallel to its line of sight.

Beside this, a second needle, which turns round a point which represents the second point of observation upon the small map, is placed upon the table, and this second needle is connected with the telescope of the other station by an electric arrangement. The movement of the distant telescope is made to cause this needle to turn to an equal angle with itself, in a somewhat similar manner to the magnetic needles of the electric telegraph. The distance between the centers of the two needles on the paper being made to scale, so as to represent the measured distance of the two places of observation, it follows that the position of the two needles will indicate the two lines of sight of the two telescopes both fixed upon the same distant object, and the point where the two needles cross each other (one of the needles being slightly below the other) will correspond to the exact position of the distant object. If the latter is in motion, and the two observers follow its movements so as to keep it constantly in sight, the two needles will constantly change their position, and their point of intersection will make the same movements upon the map, on a small scale, as the distant object makes in reality; the movements of the object and those of the point of intersection of the two needles being simultaneous. For purposes of warfare there are several applications of this instrument, which will readily suggest themselves; but similar instruments may be used with advantage for purposes of general surveys of land, and for similar operations where they are not unlikely to effect some considerable saving of time, if properly employed.—*Engineering.*

A GERMAN writer estimates that an acre of good buckwheat will yield fourteen pounds of honey daily.

Editorial Summary.

DENSITY OF POPULATION.—Even in our most populous cities much more space is allotted to each individual than is ordinarily believed. Over-crowded London allows one square acre of land to every forty of its inhabitants. New York averages fifty-six persons per square acre, Philadelphia only seven. Boston, previous to its late enlargement, was the most crowded city in the United States, but every fifty-nine of its inhabitants, possessed on an average one square acre of land. Taking the area of all the states and apportioning it out to the population thereof, it appears that every seventeen inhabitants have one square mile at their disposal, while in the Territories there are four square miles to each inhabitant. In the year 1865, Belgium, England and Wales, and France, had three hundred and ninety-seven; three hundred and sixty-seven; and one hundred and seventy-six inhabitants to the square mile respectively. If the United States was as densely populated as the former of these three countries, its inhabitants would number, 1,195,000,000, which is a little difference of one hundred and eleven millions of people, above the entire population of the world.

NAPOLEON'S NEEDLE GUN.—The Emperor, author, and architect has again appeared as an inventor. In his ostensible desire to prepare his nation for the maintainance of a vigorous peace, he has contrived a new gun concerning which nothing is really known, but reports affirm, is the most terrible weapon yet invented, a single discharge being expected to destroy a battalion. The workmen who are engaged in manufacturing this arm, are never allowed to leave the premises being locked up night and day, the Emperor himself keeping the key. In the trials, the cannon, carriages and ammunition are brought in leather valises, and the firing takes place behind a screen of boards. It is known that at 8,200 feet, the balls pierce an iron plate eight-tenth inches thick. Each cannon fires twenty shots in a minute and two men suffice for the transporting of the field piece with its carriage, ammunition, etc. Says a French notice of a late trial, "a clump of trees five thousand feet distant, were mowed down in a few minutes, like a grain field by a steam mover. It was positively frightful."

IRON SAND.—One of our exchanges lately noticed the discovery of finely divided particles of ferruginous sand in unlimited quantities upon the seashore of New Zealand, and in a very non-commital style adds, "it is announced that a process has been discovered, by which this sand may be converted into use." Wherein the novelty of this discovery lies we have failed to discover. The existence of this iron sand, is nothing new, and the direct manner of smelting it, is simple enough, and has been practiced for years. Iron ore, finely comminuted and probably resembling this sand, is used in its natural state without previous smelting, in forging iron faggots.

TENACITY OF LIFE.—A large flowered and fleshy plant which flourishes in British, Columbia, Oregon and California, posseses a most astonishing tenacity for life. Botanists have great difficulty with the plant for it will revive after being dried pressed and lain in a herbarium for several years. Dr. Lyall once immersed a species of the plant in boiling water to stop its growing propensity, yet more than a year and a half afterwards it showed symptoms of vitality, and in May 1863, produced its beautiful flowers in the Royal Gardens at Kew.

AN INDIA-RUBBER TONGUE.—A Paris coachman having lost his tongue by amputation—considered necessary because of a cancer thereon—a surgeon of the Hotel Dieu replaced it with with one made of India-rubber. Although, like old dog Tray, "he cannot speak," he tastes and smokes his pipe with apparent enjoyment. After eating he takes out his tongue, cleans it, and carefully lays it away in his pocket until it is again called into requisition.

PHOTOPERIPATETIGRAPH.—This is a contrivance which is bound to bring itself into notice on the strength simply of its name, and independent of any merit it may or may not possess. A Missourian photographer is the originator of this abreviated cognomen, and the contrivance is a dark closet mounted on wheels and containing all the apparatus required for out-door photography.

BOTTLES HERMETICALLY SEALED.—Gelatin mixed with glycerin yields a compound, liquid when hot, but becoming solid by cooling, at the same time retaining much elasticity. Bottles may be hermetically sealed by dipping their necks into the liquid mixture, and repeating the operation until the cap attains any thickness required.

A NEW FRENCH COIN.—In carrying out the project of making a unification of gold coins of different nations, the French government propose soon to issue a new coin of the value of twenty-five francs, which will nearly correspond with ten Austrian florins, the English sovereign, and the American five-dollar gold piece.

NEW POSTAGE STAMPS of four different styles are being prepared in Paris for the Egyptian government. The first denomination has on its face an engraving of the pyramids; the second, a representation of Cleopatra's needle; the third, a picture of Pompey's pillar; and the fourth, a vignette of the Sphinx. Stamp collectors will take notice accordingly.

IN CEYLON there is a fig tree 2,155 years old, having been planted 288 B. C. Its history from that date is preserved by both documentary and traditional evidence.

AERIAL PERSPECTIVE.—The appreciation of distance and magnitude of objects is entirely a matter of training or education. From greater practice, most people can better judge of objects on a plane than of aerial magnitudes. Thus, to one observer the full moon appears many feet in diameter, while to another it seems but a few inches across. We are reminded of this fact, in connection with the testimony concerning the late boiler explosion in this city. No two witnesses of its aerial flight agree as to its apparent size while in the air, but indulge in such wide comparisons as likening it to a hat, a hogshead, a nail or a barrel. With such vague testimony, an interesting point as to how high the boiler was thrown, it seems can never be determined.

NEW APPLICATION OF PHOTOGRAPHY.—Corridi has ingeniously contrived an apparatus by which a ship's course is accurately registered during the entire voyage. In place of the symbol on the card of the vessel's compass indicating north, a hole is punctured and a small lens inserted. Through this the light passes, and acts upon a roll of sensitized paper, made to move with a regulated speed by clockwork. The paper continually changes its position with the ship, but the lens is ever maintained in the magnetic meridian; hence the deviation of the vessel therefrom is recorded.

FLY PAPER.—In consequence of the sometimes fatal effects caused by the use of paper prepared for the destruction of flies, a cotemporary suggests a substitute which is devoid of danger, and though effective in its working, shows mercy to the entrapped. It is formed by moistening blotting paper with a concentrated solution of quassia. The prepared paper is moistened with water, the unsuspecting victims being attracted to it in great numbers for the purpose of quenching their thirst, but soon appear to be struck dead, and may be easily destroyed before the effects of the anesthæsia has passed off.

CRANIAL CAPACITIES OF MAN AND MONKEYS.—Dr. Bischoff, of Munich. has just published a series of lithographic plates, comparing the skulls of the gorilla, chimpanzee, and orang-outang. From a measurement of thirty-five crania, he found the maximum internal capacities to be, of the gorilla, 28·37 cubic inches; chimpanzee, 28·07 cubic inches; orang-outang, 35·07 cubic inches. The last is said to be the largest monkey skull ever brought to Europe. The human skull has rarely, if ever, a capacity of less than 65· inches, and attains its maximum in 114 inches cubical capacity.

FOSSIL IVORY.—From New Siberia, about forty thousand pounds of fossil ivory, or the tusks of at least one hundred mammoths, are annually procured. Notwithstanding the enormous amount already carried away, the stores of fossil ivory do not appear to diminish.

A FIRE-PROOF DRESS.—Mr. Champy has invented an ingenious form of fire-proof dress. The clothes are woolen, but the waist belt is in connection with the fire engine, and being provided with a stop cock, the wearer can instantly saturate himself with water.

CHANGE OF STATE AND CONDUCTING POWER.—Common salt, or chloride of lead, in a state of igneous fusion, are excellent conductors of electricity; when allowed to cool after being thus fused, they completely prevent the passage of electricity.

WE are indebted to John A. Whipple, the distinguished photographer of Boston, Mass., for a couple of very large and beautiful marine views, containing portraits of the Cunard steamer *Java* and the U. S. steamer *Guerriere*.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

There are 341 manufacturers of false teeth in the city of Paris,

By the 1st of November the Union Pacific railroad will be completed as far as Cheyenne City, Dekota Territory, at the base of the Rocky mountains. This is the point of intersection of the Denver branch railroad—from which place it is distant one hundred and twelve miles—the distributing point for Colorado mines, and the general depot for all parts on the Fort Laramie, Fort Reno and Montana roads.

The sugar product of Brazil, according to the report of the English Consul, Mr. Morgan, though formerly almost entirely the product of slave labor, does not appear to have suffered from the abolition of slave traffic. Last year's exports amounted to 48,000 tuns, while the average of the preceeding twenty-five years was only about 41,000 tuns.

The aggregate production of gold in the world for eighteen years past, is $3,341,500,000, of which the Pacific States and Territories yielded nearly one third, while Australia and New Zealand produced nearly one fourth.

Sixty-one trains are run daily between London and Manchester, one half being run in excess of the requirements of the traffic. The excess of train miles is upward of two millions and the cost of running them over £335,000 a year.

Steel Pen Manufacturers in Birmingham employ 320 men and 2,000 women and girls; 98,000 gross of pens are turned out weekly, in which ten tuns o steel, worth $15,000 are used. Thirty years ago these pens sold at 8s. per gross, they now bring only 1½d. to 1¾d.

The manganese mine at Red Rock, in San Francisco bay yields ore in sufficient purity to warrant its working, a fortune which has attended the working of no other manganese mine in the country. In three weeks five miners extracted upward of sixty tuns of first-class ore the market price of which is $30 per tun. The ore is extracted by contract at $10 per tun, the contractor agreeing to pay all expenses, from the raising of the ore to its delivery at San Francisco.

An oil bearing stratum three hundred miles square, has been discovered not far from the city of Pekin, China.

The sulphur mines of Italy are producing 300,000 tuns per annum, representing in a crude state, a value of $6,000,000. The greater part of this supply comes from Sicily. The separation of the sulphur from the gangue is always affected by liquidation, the necessary heat for the fusion being obtained by burning a portion of the ore; by this method only ten of the 20 parts of sulphur is obtained pure.

Mr. Ransome has made many grindstones, from the artificial stone that bears his name, and they are found to be of a perfectly uniform quality, but wear faster than ordinary stones. By increasing the proportion of silicate o soda, and by some other unimportant changes in his process this fault has been partially remedied.

A train on the Northwestern Railroad, in the western part of Iowa, was a few days since delayed one hour and a quarter by grasshoppers, which covered the track so thick that the engine drivers slipped on the rails.

The London underground railroad has carried in six months' time over 12,000,000 passengers, or about three times the population of London. The actual number transported over the line since its opening in January 1863, is about 70,000,000. The line is only three and three quarter miles long; and was constructed at an enormous cost, but makes annual returns in dividends of from twelve to fifteen per cent.

Since the year 1812 when the first load of anthracite coal was taken back to Philadelphia and given away, the production consequent upon an extended demand has increased with great regularity, and now it reaches from ten to twelve million tuns a year. It is estimated that in ten years it will have reached the enormous annual production of twenty million tuns.

It is stated on good authority that there are some 3,000 pianos rented to parties in this city. One firm alone hires out one thousand which yield them an income of $80,000 yearly.

A Chicago firm advertised certain agricultural implements in a Buenos Ayres paper as an experiment. The result was an order from that country for $30,000 worth of the goods.

A coach car built upon the English plan, will soon be put upon the New London and Worcester railroad to run in connection with the old Norwich steamboat line between Boston and New York. The car contains seven compartments, which are finished in sumptuous style, and cost $18,000.

The city of Waterbury, Conn., has manufactories for making cutlery, clocks, iron and steel rollers and machinery, jewelry and its rolls, hosiery, hardware, pins, percussion caps, flasks, brass goods of all kinds, lamps and trimmings, buttons, buckles, hinges, books, paper, boots and shoes, brooms boxes, cartridges, fire-arms, curtain fixtures, mattresses, yarns, thread, hats carriage trimmings and hardware, oil burners, coffins, confections, cigars soaps, crackers, daguerreotype plates, mats and preservers, springs, rails, collars, eyelets, escutcheons, furniture gas burners and pipes, silver ware, hair-pins, hooks and eyes, leather, locomotive tubes and flues, lamps, medals, military ornaments, cloths, nails, reticules, shears, suspenders, wires, carriages, whips and thimbles. We know of no place which produces a greater variety of manufactures.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

STRETCHER FOR DRYING HOSE.—Sylvester J. Wright, Ellsworth, N. Y.—This invention has for its object to furnish an improved instrument by means of which hose may not only be kept from shrinking while drying after being washed but may also be shaped to the foot or leg.

DEVICE FOR HOLDING SHEEP WHILE BEING SHORN.—Webster Ellyson, West Branch, Iowa.—This invention is designed to furnish an improved apparatus for holding sheep while being shorn and it is formed by the combination of the platform having hinged ends, hinged adjustable side boards, supporting racks, straps, loops lever pawls, catches and boxes so constructed and arranged that the sheep may be securely held and its position easily and quickly changed as required for shearing each part conveniently.

ANIMAL TRAP.—Silas Ward, Richmond, Ill.—This invention has for its object to furnish an improved trap for catching rats, mice, ground squirrels, quails, etc., which shall be cheap, simple in construction, not liable to get out of order, and which shall be self setting.

CULTIVATOR.—J. H. Barley, Sedalia, Mo.—This invention has for its object to improve the construction of cultivator patented by the same inventor Sept. 4, 1866, so as to make it more convenient in use and more effective in operation.

WAGON TONGUE SUPPORT.—O. Lapham, El Paso, Ill.—This invention has for its object to furnish an improved means for supporting the tongue so as to relieve the horses from supporting its entire weight.

WINDOW SHADE FIXTURE.—William Campbell, New York City.—This invention has for its object to furnish an improved device by means of which the spring roller of a window shade may be made to hold the shade stationary at any desired elevation and yet allow the shade to be drawn down or run up without obstruction or stoppage as far as may be desired.

MANUFACTURING HAY FORKS, MANURE FORKS, ETC.—George B. Ely,—St. Johnsbury, N. Y.—This invention has for its object to furnish an improved machine by means of which the proper form may be given to hay and manure fork tines by drawing them out by the action of rolls having grooves of the necessary shape formed in them.

LAND ROLLERS.—George R. Burt, Perry, N. Y.—This invention has for its object to so improve the construction of land rollers as to make them more convenient and effective in operation.

CULTIVATOR.—J. W. Connely, Charleston, Ill.—This invention has for its object to improve the construction of the cultivator patented by the same inventor Februaay 19, 1867, and numbered 62,135, so as to make it more satisfactary and effective in operation.

CAR AND OMNIBUS FARE BOX.—John B. Slawson, New York City.—This invention relates to a fare box for cars and omnibuses, which is so arranged that the lamp is altogetner out of the way of the fare box, so as not to obstruct the inspection of the contents of the box, and so that by the lamp sufficient light is thrown into the fare box and upon the money trap to completely illuminate the same.

MACHINE FOR POUNCING THE BRIMS OF HATS.—P. W. Vail, Newark, N. J.—This invention consists in so arranging the brackets and pouncing rollers between which the brim of the hat body is fed, that both sides of the same may be pounced at once. The feed rollers as well as the pouncing rollers are adjustable up and down, so as to expose the brim to more or less pressure, as may be desired.

THILL COUPLING.—Lyman Derby, New York city.—This invention relates to a new and improved mode of securing thills to axles, whereby the former may readily applied to and detached from the latter, and at the same time a secure connection be obtained—one that will not admit of a casual detachment of the thills from the axle.

HEAD REST FOR CHAIRS.—Henry Snowden, Baltimore, Md.—In this invention the head rest is supported on a universal pivot, and is fixed upon sliding adjustable rods, to as to be capable not only of turning in every direction, but also of being extended forward, backward, laterally, or vertically, and instantly clamped in the required position by a single movement of one set screw.

HORSESHOE.—Albert S. Wilkinson, Pawtucket, R. I.—The subject of this invention is a horseshoe constructed with a continuous sole of india rubber or similar elastic material, serving to relieve the horse or other animal from danger of slipping and from injurious and uncomfortable concussion of the feet when traveling upon hard roads.

FIRE EXTINGUISHER FOR VESSELS.—Daniel Spooner, Lowell, Ohio.—The object of the invention is to draw water from beneath a vessel and elevate it to any part of the ship, for the purpose of extinguishing fires, by means of the direct action of steam.

WINDOW BLIND.—C. K. Marshall, Vicksburg, Miss.—This invention relates to a new article of manufacture, and consists in the construction of window blinds with metallic slats.

CITY CAR OR OMNIBUS MONEY BOX.—John Blackadder, New Orleans, La.—This invention consists in arranging reflectors in a city car money box in such a manner that the fare deposited can be seen by the passengers and by the driver, and also in arranging a wheel so that the fare deposited can be deposited in a drawer by the driver.

ATTACHMENT FOR COOK STOVES.—Jeannette Garrison, New York City.—This invention consists in applying a screen to the upper part of the fire chamber of a cook stove between the fire chamber and the top flue in such a manner that coal, cinders, etc., will not be allowed to pass into said top flue and pass down into the diving flue and choke up the same, a contingency of very frequent occurrence and which occasions a great deal of inconvenience

PUMPING STEAM ENGINES.—Robert Allison, Port Carbon, Pa.—This invention relates to a new and improved method of operating the valve of a steam engine when the same is used for pumping water from mines and other purposes.

WATER REGULATOR FOR STEAM BOILERS.—R. J. Jordan, Elkhart, Ind.—This invention relates to a new and improved method of regulating the quantity of water which is discharged into a steam boiler by the force pump.

WASHING MACHINE.—J. H. Quackenbush, East Saginaw, Mich.—The object of this invention is to provide a simple and effective machine for cleansing linen and other articles of domestic use, and it consists in subjecting the article to be washed to both a squeezing and a rubbing process at the same time, by means of corrugated rollers.

STEAM ENGINE.—Joseph McConnell, Iowa City, Iowa.—This invention relates to a new and improved valve motion in the steam engine, the principal novelty consists in opening and closing the ports of the engine cylinder by operating two cylinder valves at each end of the engine cylinder (one within the other), the inner valve being a cut off valve.

DOOR HOLDER.—Wm. A. Messler, Eureka, Ill.—This invention relates to an improved method of holding doors open, and consists of a spring latch attached to the wall against which the door opens, the door latch slipping into the latch.

MACHINERY FOR FINISHING SEWING THREAD OR YARN.—Samuel Barbour, Belfast, Ireland.—This invention relates to an improvement in machinery for finishing sewing thread and yarn, by which a high polish is put upon the surface and the thread is made very smooth and level.

DISH AND VEGETABLE WASHER.—J. N. Paddock, Oswego, N. Y.—This invention relates to an article of domestic utility, and consists in a contrivance for rapidly and effectually washing and drying a number of plates and dishes or for washing vegetables.

CAN.—Andrew D. Armstrong, Pittsburgh, Pa.—This invention relates to an improvement in cans, and is specially serviceable for cans used to contain white lead and similar substances. It consists in providing a second or internal rim to the can, making the lid sit perfectly tight.

MARKET BOX.—Frederick Gearing, Pittsburgh, Pa.—This invention relates to a new and useful improvement in the construction of boxes for market gardeners. The invention consists in constructing the boxes in such a manner that they may be readily taken apart and put together, whereby the boxes, when their contents are sold or disposed of, may be taken apart and packed in a very small compass and empty boxes, therefore, transported at a very small expense.

COMBINED FILTER AND COOLER.—H. W. Fisher, Philadelphia, Pa.—This invention consists in combining a water filter and a cooler in such a manner that a very portable device is obtained for household purposes and one which will operate perfectly with but a moderate consumption of ice.

SPRING FOR VEHICLES.—W. H. English, Macon, Ga.—This invention has for its object the obtaining of a spring for vehicles which will be light or composed of a small weight of metal and still be strong and durable and far less expensive to manufacture than the ordinary springs in use.

CORN PLOW.—M. C. Buffington, La Harpe, Ill.—This invention relates to a new and improved corn plow or cultivator and consists in a novel construction of the same, whereby the draft pole is elevated above the corn so as to prevent the same being broken down and injured and a draft obtained which will admit of the draft pole being balanced so as to avoid any undue pressure on the necks of the draft animals, while the plows are rendered capable of adjustment as circumstances may require.

MODE OF CREATING DRAFT IN STEAM BOILER FURNACES.—William H. Squires, New York City. This invention consists in introducing into the lower part of the smoke stack, or into the chamber with which the lower part of the smoke stack communicates, a conical chamber into the lower part of which a steam tube communicating with the boiler is inserted. The steam tube is provided with a stop cock and all arranged in such a manner that steam may be allowed to pass from the boiler into the lower part of the smoke stack and create the necessary draft.

HAND SEEDER.—Thomas Bradley, Preble, N. Y.—The object of this invention is to furnish a cheap and convenient hand seeder or planter adapted to seeds of different kinds and to be connected with a hoe to be operated by hand to discharge the seeds.

CULTIVATOR.—Henry W. Ostrom, Grand Rapids, Mich.—This invention relates to a new and improved cultivator or harrow and consists in attaching a series of ordinary cultivator teeth to the ends of a set of slats or bars which are hung upon a frame in such a manner that the teeth can rise and fall to adapt themselves to the inequalities of the surface of the ground.

HAND SPINNING MACHINE.—John Blackwood and Theodore C. Wilson, Cincinnati, Ohio.—This invention relates to a new and useful improvement in the construction of hand spinning machines for wool and other fiber and consists in the arrangement of mechanism for operating with a crank upon two or more spindles set in the arc of a circle with one pulley band which dispenses with intermediate tightening pulleys, and in connection therewith a reciprocating feed carriage. The advantages of these improvements are cheapness in the construction of the machine, simplicity of the machinery which performs good work without liability to get out of order, while it is easily managed and requires but little power to operate it.

TUNING ATTACHMENT FOR GUITARS, BANJOS, AND SIMILAR STRING INSTRUMENTS.—H. Sechausen, Memphis, Tenn.—The object of this invention is to obtain a very simple means whereby the strings of a guitar, banjo, or other similar string instrument may, after being used, be relaxed with greater facility than hitherto, and, when required for use, be more readily tightened and tuned.

CULTIVATOR.—John Schröder, Kickapoo, Ill.—This invention relates to new device for regulating the draft of horses, and for equalizing the same; also for making the plow beams flexible, so that they can be turned in every direction.

CHUCK.—Wm. T. Cole, New York city.—This invention relates to a new self-acting chuck, which is so arranged that it will be set the tighter the more pressure is applied to the article held by it, so that the strain is in exact proportion to the work to be done. As soon as the work stops, the huck relaxes its hold, but resumes it again, as the work is recommenced.

MACHINE FOR RENOVATING AND CLEANING FEATHERS.—Ossian C. Monroe, Poultney, Vt.—This invention relates to a new machine for cleaning feathers, which is so arranged that the feathers can be easily cleaned by the application of steam, without receiving any of the products of condensation, and can be dried, when cleaned, by the nearer walls of the vessel in which they are held.

WAGON SPRING.—C. P. Hawley, Mosherville, N. Y.—This invention relates to a new manner of arranging the springs on all sorts of vehicles, sofas, railroad cars, and for other purposes, and consists in having two frames made of wood or other suitable material, hinged to lugs projecting from the underside of the wagon box or other article.

MACHINE FOR TAPERING LEATHER.—Wm. Mannheim, New York city.—This invention relates to a machine in which the edges of leather straps can be bevelled or tapered, and also the ends of the same, but in which, when desired, the leather can also be scraped or shaved, so as to be reduced in thickness to an equal degree throughout.

WATER WHEEL.—Legrand D. Wynkoop.—Owasso, Mich.—This improvement consists in a modification of the upper part of the wheel, whereby a case for the same is dispensed with, and the wheels simplified and rendered more efficient and desirable than hitherto.

COMBINED GAGE, PRESSER, HEMMER, ETC., FOR SEWING MACHINES.—Joseph P. White, Savannah, Ga.—This invention relates to a new attachment for sewing machines, by which the cloth is held down, gaged, tucked or hemmed and if desired marked for further tucks.

FIRE ESCAPE BLINDER FOR HORSES AND CATTLE.—Smith Ferris, New York City.—This invention consists in the use of a cap which when laid on the horse's head, covers his eyes, and thus permits that he be led out of danger in case of fire. This cap is so arranged, that it can be placed at once on the animal's head, and be fastened thereto by means of hooks and straps.

FASTENING BUTTONS ON GARMENTS.—Eiss J. Warner, Newark, N. J.—The object of this invention is to fasten buttons to garments with tubular shanks or eyelets, at a single operation, and it consists in a press provided with an adjustable die through which passes a spring slide bar for holding the tubular shank upon the die, to be pressed thereon, and thus fasten the button on a garment, and which also holds a piercing needle for making a hole in the cloth to receive the tubular shank.

HARROW TEETH.—F. R. Willson, Columbus, O.—This invention relates to an improvement in the construction of harrow teeth, and consists in a tooth with two cultivator rings, placed one ahead of the other, made of a single steel plate, of a lozenge form, by splitting the plate partly across, and turning out the split parts in opposite directions, right and left, leaving the upper side of the plate solid, to be fastened to the harrow frame by screw bolts, which may be secured to top of the plate with a cast iron head upon it, or in any other suitable manner.

FAGOT FOR BEAMS.—Wyatt W. Miller, Safe Harbor, Pa.—This invention relates to a new manner of forming piles or fagots for large double flange beams for buildings, bridges, and other structures, and consists in composing the whole fagot of flat plates, and connecting the same by means of bolts, so that the fagot when thus made will represent as nearly as possible the shape of the finished beam.

PUMP.—Gilbert M. Cole, Folsom city, Cal.—This invention relates to a new double-acting pump, which is provided with double pistons, sliding in a cylinder, the valves being arranged stationary in the cylinders between the pistons, and the suction and discharge pipes being arranged on the sides of the cylinder in such a manner that the water or other liquid to be pumped enters the cylinder between the valves, and, passing in a straight, or nearly nearly straight line, through the cylinder, is discharged.

BOTTLE.—H. S. Carley, Cambridgeport, Mass.—This invention relates to a new manner of arranging the necks of bottles containing soda-water or any other liquid charged with carbonic acid, with a view of retaining the cork or stopper, so that the same cannot be lost or mislaid, although the bottle can be opened or closed at will.

MANNER OF RETAINING HAT BODIES ON BLOCKS.—Jas B. Brown, Middletown, N. J.—This invention relates to a hat block, which is so made and arranged that the inconvenience of hooking or otherwise securing the hat body to the same may be overcome.

RAILROAD CAR BRAKE.—Walter S. Shotwell, Paterson, N. J.—This invention relates to a new and improved railroad car brake of that class which are operated or applied by the movement of the car after the engineer cuts off the steam. The object of the invention is to obtain a car brake of the class specified which will be simple in construction, capable of being adapted or applied to the ordinary hand brakes now in use and still admit of the brakes of each car being applied by hand whenever it is necessary to detach a car from a train and switch it off from the main track.

COTTON BALE TIE OR HOOP LOCK.—James W. Truman, Macon, Ga.—This invention relates to a new and improved tie or lock for connecting together and securing the ends of metallic hoops for cotton bales. The invention consists in constructing the tie or lock of a single piece of wire or rod bent or swaged in the form of a quadrangle or square, the ends of which, composing one side of the square, extend entirely across the whole width of the device, said ends being disconnected but forming a side composed of the thicknesses of the wire, whereby a tie or lock is obtained which may be very readily applied to the hoops, and which will form a very strong and secure fastening.

FODDER CUTTER.—D. A. Smith, Pomeroy, Ohio.—This invention relates to a new and improved fodder cutter of that class which have the cutters or knives attached to a wheel which serves the office of a fly as well as that of a cutter wheel. The invention consists in a novel construction and arrangement of the parts, whereby a very superior machine of the kind specified is obtained.

GRINDING MILL.—Jabez Burns, New York City.—The object of this invention is to construct a mill for grinding coffee and other substances, whereby the same will be granulated and not ground to dust or pulverized as is done by the mills now in general use, and whereby the article to be ground is moved by centripetal and not by centrifugal force, and is gradually crushed or broken to small lumps, so that for the actual grinding process but little power and surfaces are required.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

H. W. P., of Vt., asks if coal tar applied to the outside of wooden water logs will preserve them from decay. Probably nothing so cheap and effectual can be found. Kyanising the wood might be better, but it would cost much more. The coal tar will be found to be a sufficient protection.

S. W. H., of C. E.—We do not understand the processes of preparing calf skins beyond what is generally known. As to the oils used for "scenting" the skin we never heard of that process. For "stuffing" the skin menhaden and other fish oils, neats-foot oil, and tallow are used.

G. W. P., of Mass.—Many of the old pictures were painted on "panels" of wood. Some of the most valuable of paintings were on wood. In time the wood, unless carefully preserved, becomes worm eaten or decayed threatening the destruction of the picture. These are "restored" by being transferred to a canvas backing. The process is an interesting one. The painting is secured, face down, to a table, and the wood gradually planed and scraped away until all its substance is removed, leaving only the paint attached to the table. Then this is cemented to a canvas and the picture is restored. Of course, it is a work of time demanding patience and great skill. It is unsafe for a novice in the art to attempt it.

J. B. B., of Mass.—We know nothing of the locomotive performance you speak of. It may be possible to run 150 miles in 90 minutes. Whether the engine and tender could carry water and fuel enough would depend on their construction, the load, the grade of the road, direction of the wind, etc. The quick express trains of England do run nearly 60 miles per hour including stoppages. During the past summer a train made a run on the Hudson River Railroad of 10 miles at the rate of 78 miles in 60 minutes, carrying the board of directors.

A. P., of N. Y.—The mineral you inclose as found in quartz rock is an ore of copper containing carbonate and sulphide of copper.

J. W. R., of Mich.—The word "amorphous" as applied to phosphorus, or indeed, any other substance, means simply shapeless or without regular proportions.

J. D., of Mass.—We cannot tell you of any special book teaching the art of "putting up machinery, hanging shafting, etc." The best teacher we know is experience combined with observation, common sense, and good judgment, and the instruments to be used are the plumb, level, square, and measuring rule. With these we never failed to hang shafting or locate machines properly. You can no more learn to hang shafting from books than you can learn how to draw a file.

E. V. R., of Mich., asks how many kinds of geographical projections there are as applied to map making, who were their inventors, and what is the principle of laying out parallels of latitude and meridians of longitude. These questions are all answered in any good treatise on geography. Get "Davies' Navigation" or "Bowditch's Navigator." The various kinds of projections may be considered under the heads authographic, stereographic, gnomic, globular, and the developement, for definitions of which terms we refer you as above.

F. S., of N. Y., desires to know if a young man who has been through a course on naval architecture by private instruction would be debarred from practice for this reason, and if there is in New York city a college for such studies. We reply that the first element of success is merit or talent. In this country it does not matter whether one's knowledge was acquired through private instruction or whether he gained it by a regular course in some educational institution. If you are competent you can be successful. We know of no institution where naval architecture is taught. This is learned in the engineer's office and the ship yard.

E. B. H., of Vt., says he put up a pair of mill stones in North Carolina which were grinding well the first of July last, but since that the lower end of the spindle and step heats, both being composed of hardened and polished steel and running in oil. Our correspondent has probably committed a very common error. Where great weight combined with rotation comes upon a comparatively small surface the two rubbing surfaces should be of different materials. No amount of hardness or polish will prevent wear under other circumstances. If the end of the spindle is steel the step should be of much softer material. Even cast iron is better than steel for the step, and Babbitt metal or hard wood with the end of the grain presented would be better still. Oil is of no use as a lubricant unless it is permitted to get between the bearing surfaces. Probably the spindle bearing is too small for the weight to be sustained. Much could be written on the subject of the relative areas of bearing surfaces for journals.

C. E. S., of Md., wants a cement for uniting brass or steel to paper or pasteboard. Try shellac.

G. S., of Miss., asks if india-rubber will make good inking rollers and wants the proportions and method of combination of the constituents. In reply we can only say that the attempt has been repeatedly made to construct a good inking roller of india rubber, but without success. Printers prefer the roller composed of molasses and glue to those of any other materials. Glycerin and glue in proper proportions make a good roller, but it fails in such wet weather as we have had this last summer.

W. P. B., of Pa.—Glass for lenses, after being ground to shape, is polished successively by emery, rottenstone, pumice stone, and the oxide of iron known as rouge.

W. T., of Conn.—If there is any new method of electro-plating of German silver or Brittania metal different from that ordinarily used on other metals, we are not aware of it. The usual process can be learned from treatises on this subject.

E. J., of N. Y.—The velocipede mentioned in our Notes of the Paris Exposition is very novel but simple in its construction. We have made arrangements for drawings of it to publish in a few weeks.

J. W. M., of Mo.—The regulations of the Metropolitan Fire Department of this city do not allow the steam fire engines to carry more than 80 pounds of steam, but this limit is often passed, the pressure frequently running as high as 140 or even 160 pounds. We are informed that the boilers of every Amoskeag engine built is tested to 200 pounds steam pressure.

W. R. S., of Ind.—When it is 9 A. M. in New York it is 9 P. M. of the same day at the Antipodes.

F. M. P., of O.—The explanations of the fact of the refraction of light are theoretical and therefore unsatisfactory. . . . The spark produced by the striking of flint and steel results from the conversion of ordinary mechanical force into heat.

J. A. S., of Pa., suggests that the electricity of belts is sometimes the occasion of the accidents in factories when the dresses of women become entangled in the machinery. According to his theory the skirt of the dress is drawn to the belt by the electrical attraction.

R. F., of Conn., describes a basswood tree growing with considerable vigor from a stump and roots which are apparently dead. If the stump and roots were really dead the case would probably be unprecedented.

R. V., of Mass.—Plumbago was formerly, but improperly called carburet of iron. When pure it contains no iron, and the iron which often is associated with it, is never in chemical combination with the carbon.

C. B. T., of Texas.—The first clause of section 5th, of the Act of 1842, provides that a person shall not affix upon a thing not patented by him the name of another who has obtained a patent upon the same thing, without the consent of such patentee; the second clause, that a person shall not affix the word "patent," or "letters patent," or "patentee," or any word or words of like import with intent of imitating a patentee's device on an *unpatented article, or in other words, on an article not covered by any patent whatever*, for the purpose of deceiving the public.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Iron Manufacturers and Capitalists—Examine the Model Rolls at the American Institute. Patent for sale. P. Bright, Philadelphia.

For Sale—A small Metal-working Shop—Tools in good order. Also, two patents. Terms easy. Address G. Strong, care H. N. Meyers, 218 Fulton street, New York. 14 & 15

J. C. J., of Estillville, Scott county, Va., desires the address of parties who make a business of boring wells.

Bolt-Heading Machines Wanted. Address National Iron Co., Danville, Montour county, Pa.

Wanted, for a foreign correspondent, a first-class Rice Hulling and a Rice Polishing Machine. Address Munn & Co., 37 Park Row sending full description, price, and weight.

Black Walnut Lumber, first-class, green or dry, can be furnished by D. Auld, Jr., Iberia, Ohio. Write to him.

Railroad Companies wishing a Good Snow Plow and other track-obstruction removers, are recommended to address or consult Mr. Sheridan, whose advertisement is to be found in another column.

NEW PUBLICATIONS.

THE BROADWAY for October.

The second number of this new monthly has made its appearance. It is full of original illustrations, and bears evidence of success. Published at 428 Broome street, N. Y. Price 25 cents a number.

THE NEW DOMINION for October.

This is another new literary monthly, published by John Dougall & Son, Montreal, Canada. The first number (October) is very creditable in execution, contains 64 pages, and is sold at the low price of 10 cents a copy.

HERALD OF HEALTH for October.

This is an old magazine and always good. It is devoted to physical culture, and its teachings are of incalculable value in the household. Miller, Wood & Co., publishers, 12 Laight street, N. Y. Terms $3 per annum, 30 cents per single copy.

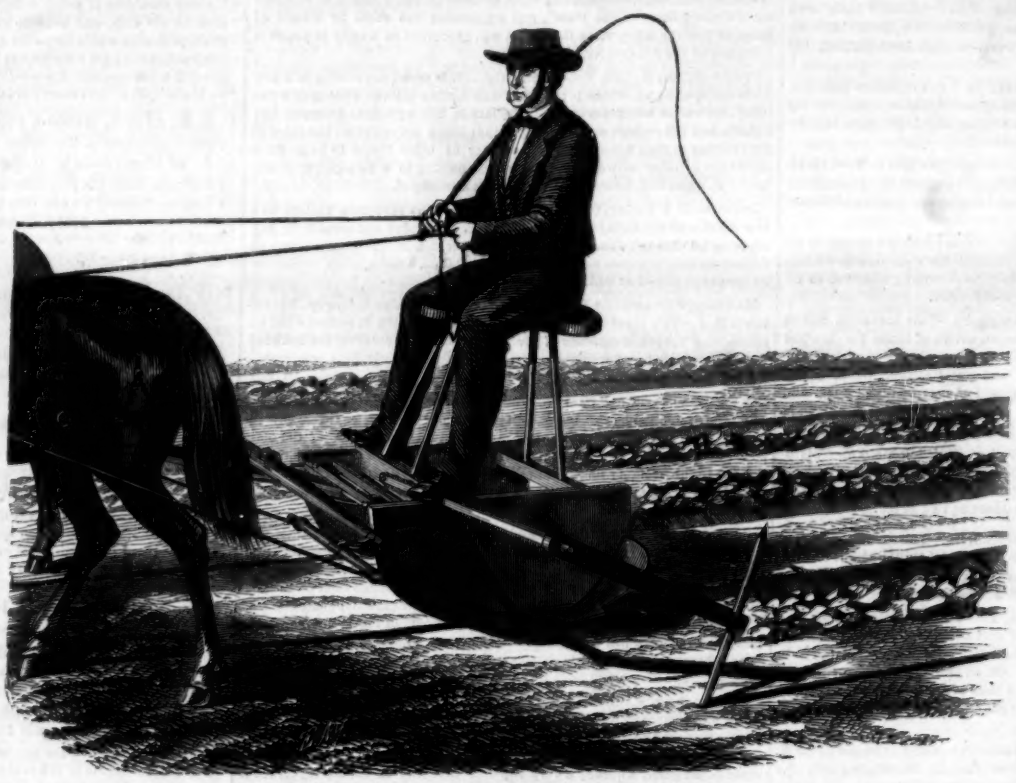
EXTENSION NOTICE.

L. Otto P. Meyer, of Newtown, Conn., having petitioned for the extension of a patent granted to him the 29th day of December, 1853, for an improvement in processes for vulcanizing caoutchouc compounds, for seven years from the expiration of said patent, which takes place on the 29th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of December next.

Device for Marking and Furrowing Land for Corn.

The inventor of this device claims that it does its work easier and more effectually than others; that it does not harden the soil, and thus hinder the germination of the seed; that it can be driven within a few feet feet of the fence, and be easily turned; and that it is cheap, being manufactured at a cost so low as to bring it within the reach of all.

As seen, it is in form very like a boy's sled, the runners being three and a half or four feet apart, according to the width of the rows. The runners are shod with iron, two inches wide, by one thick. At the rear of these runners, on the outside, is attached a mold board, or share of cast iron, for making the furrows. Pivoted to the center of the front cross-piece of the sled is an arm, projecting from the side of the sled, and carrying a bar and pointed marker for determining the line of the furrow next to be formed. The depth of this mark may be controlled by the driver's foot. His seat is so arranged that, by sitting further forward or back, he may, by thus elevating or depressing the back end of the sled, regulate the depth of the furrows plowed by the shares. Farmers will readily understand the operation of this implement without further description.



PLUMB'S PATENT FURROWING SLED.

It was patented February 13, 1866, by Joseph Plumb, who may be addressed relative thereto at Flemington, N. J.

Discoveries in Palestine.

The secretary of the Palestine Exploration Fund writes to the London *Times*:—

"When the committee of the Palestine Exploration Fund sent out their second exploring party to the Holy Land in January last, under the charge of Lieutenant Charles Warren, Royal Engineers, they gave him a general instruction to make Jerusalem his head quarters, and to excavate, and investigate about the city as much as possible, especially in the sacred enclosure of the Haram esh-Sherif. The result is that outside the walls of the enclosure he has made a discovery, which is almost, if not quite, as important as any that has ever been made in or about Jerusalem, and which cannot fail to be the fruitful parent of many more. He has found that the south wall of the Haram, which rears its venerable face to a height of eighty feet above the soil, descends to no less a depth than fifty-three feet below it—the solid rock of Mount Moriah, on which it is founded, being covered with that immense thickness of debris. Thus this wall must originally have stood at a height of one hundred and thirty feet above its foundations, fully justifying the expressions of Josephus, who says concerning it that 'if any one looked down from the top of the battlements into the valley he would be giddy, while the sight could not reach to such an immense depth.''

"The foundation and unworn masonry of the buried portion may be expected to disclose many a secret affecting these venerable walls, secrets which Lieutenant Warren is now diligently occupied in revealing. But this is not all. He found two other things. He found first, that the eastern wall was prolonged beyond the southern face, and continues in the general direction of Siloam, with all the solidity and antiquity, which characterize its known portions. How far it continues, or what are its exact direction and extent, I expect to hear shortly from Lieutenant Warren. He found, secondly, that below the debris a second south wall exists twenty feet distant from the known one, and of slighter workmanship. How far this wall goes, what its purpose may have been, its relations to the 'triple gateway' and the staircase which M. de Saulcy believed that he had discovered to descend from the triple gateway, how this discovery may affect the piers of the arches below the southeast corner of the enclosure, are questions which I await further information to be able to answer.

"Our operations are threefold:

"1. Exploration—On which I have only to add that we have already materials for almost an entire, complete, and accurate map of the country and photographs of more than three hundred spots and objects, large numbers of which have never before been taken.

"2. Geology—for this our desire is to send out a party, under the charge of Mr. Prestwich, F. G. S., the eminent geologis, who has most kindly offered his services.

"3. Botany and Zoology—for which in like manner we hope to avail ourselves of the services of the Rev. H. B. Tristram, well tried and well known already in the same field, and anxious like an old hunter, to be off on his final chase."

Condition of the Oil Regions.

A correspondent of the Boston *Transcript* thus describes the oil operations in Pennsylvania:—

"At Petroleum Center about one well in six is in operation. From the high hill west of the town you can see half a dozen villages and more than two thousand wells, some new, but many more utterly abandoned. On the top of this hill there is a fine flowing well which yields fifty barrels in a day—the only flowing well in all the region. The pumping wells yield from eight to thirty barrels in the day. A well that yields less than eight barrels will not pay for the working, even at the present advanced prices. The business has now passed entirely out of the hands of speculators, and is conducted in an orderly way, by 'solid' and intelligent men, and with improved methods.

"A very intelligent owner of some of the wells explained and illustrated to me all the process of getting the oil—from the first experiment with the auger to the final refining of the crude product; the boring through the various strata, the sand pumps, the seed bag, the casing, the rods which clear out the tube, the gas furnaces—the whole very interesting, but which it would be impossible to explain in the limits of a letter. Hardly any wood is consumed now for fuel. Some of the furnaces are fed by the escaping gas, but more by benzine, of which an ordinary engine furnace burns about a barrel in twenty-four hours. The sparks from a chimney would be dangerous in so explosive an atmosphere. Smoking is strictly prohibited in the neighborhood of the wells. But, as it is, fires are very frequent—hardly a week passes without them.

"The present high price of the oil is stimulating new enterprises, and the owners of wells are encouraged. You see the derricks rising on the tops of the hills, more than three hundred feet above the level of the railway. The gas is carried up the slopes in pipes for half a mile to make fuel for boring these new wells. Not one in three will strike oil at all, and not half of those who strike it will get it in profitable quantity. But the production is still very large, never, on the whole, greater than now. It is said that the famous Noble well, which has now done its work, yielded, before it expired, not less than four hundred and fifty thousand barrels of oil. It was sold for half a million of dollars."

KIDDER'S EUREKA TRAP FISH HOOK.

"Fisherman's luck" is merely a synonym for "just no luck at all." It is bad enough to have a provoking nibble, with no earnest and honest bite, but to have your bait taken repeatedly, and not secure your fish, requires some philosophy to bear with equanimity. The design of the hook represented in the accompanying engraving is to save the angler from these vexations, by surely securing the fish which has temerity enough to receive the barbs of this hook.

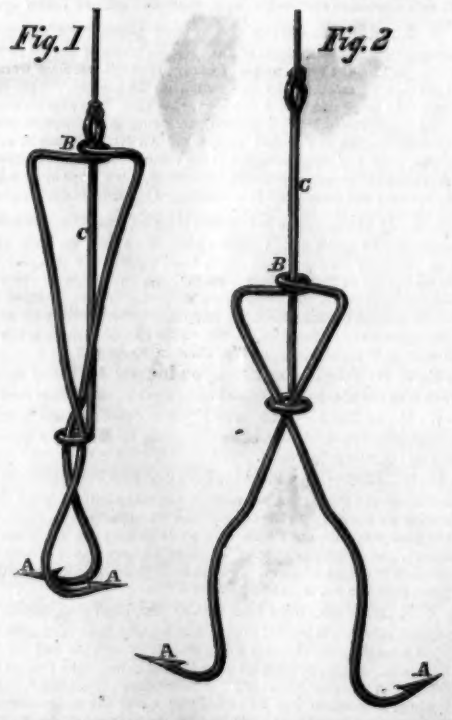


Fig. 1 shows the hook set or closed, and Fig. 2 the same sprung or open. The hook is a steel wire, the ends formed into points and barbs, A, and the center of the wire bent into an eye, B. Near the points the two arms of the wire are bowed outward, and, when sprung, as in Fig. 1, they cross or overlap. In this position they are held by a ring-clasp, C, to the upper end of which the line is attached. It is evident that a slight pull on the points, A, will slide the hook through the clasp, and allow its two sides to spring apart; of course, if the barbs are in the fish's mouth, this action will transfix the game, and hold it securely. It can be set instantly, by pushing down the clasp, and in the same manner it can be easily removed from the mouth of the fish. Its operation is readily comprehended from the foregoing.

Patented through the Scientific American Patent Agency, by Daniel Kidder, who may be addressed for the sale of the right at Franklin, N. H.

American Guns and English Armor.

If I have hitherto refrained from exposing the hollowness of the ground of self-gratulation in which some of our artillerists have been indulging, in consequence of the alleged failure of the American 15-inch gun to pierce an 8-inch plate although that plate had previously been pierced by some of our guns not of the largest size, it is because I expected that some communications from America would deal with the question in a more authoritive manner than any English spectator could do. I send you herewith an extract from the New York *Army and Navy* journal, of the 10th inst., which perhaps you may think it useful to lay before your readers, and meanwhile permit me to express my conviction that the theories so precipitately adopted with reference to the supposed inability of the 15-inch gun to pierce 8-inch plates are wholly erroneous, and must be abandoned by all who wish to preserve any reputation for a sound acquaintance with such subjects. The so-called American Mammoth powder is not the powder used in the American navy, and why was not the common 60-lbs. charge of American navy powder employed? The powder used in the American navy is somewhat stronger than the English powder, and as much as 100 lbs. of Mammoth powder has been burnt in the 15-inch gun without damaging the gun at all. Why then were such small charges of powder used in the English experiments, and why were not chilled shot tried? One would almost imagine that the main purpose of the experimentalists was self deception. Let chilled shot be used in the 15-inch gun with heavy charges of good powder, and it will be found that the shot will be projected with ease through a target representing the side of the strongest ironclad we have, whether built or building.—Vindicator in *Engineering*.

[We should add, however, that "mammoth-grain" powder has lately been adopted in the navy for the 15-inch and 20-inch guns. It is thought by some ordnance officers that the service charge will, before long, be increased enough to give 1600 feet velocity to the 15-inch shot.

We have published several articles intended to show that the trials of the American 15-inch gun at Shoeburyness were inadequate to prove its power, and we have before us now a letter from one of our ordnance officers which sustains the assertion of *Vindicator*. Our authority says: "We never now use in the 15-inch gun less than 100 lbs. mammoth powder. We get with that charge over 1,500 feet velocity." Comment is unnecessary. Since writing the above, a cable telegram informs us that, with 100 lbs. of powder, the 15-inch shot passed entirely through the 8-inch target.—Eds. Sci. Am.]

ERRORS IN SCIENTIFIC JOURNALS.

We notice in *Engineering* of September 13 a set of valuable tables on steamship performance. Referring to the steamship *La Plata*—mate to Cunard's *Arabia*—in three tables we find her length put down as 284 feet; we may be wrong, but we supposed she was some 100 feet longer than this.

Again, the weight of each of her wheels is set down at 37·5 tuns each. Is this correct, and, if not, how many more mistakes are there in these tables?

We allude to this because we have been annoyed to find errors, owing to negligent reading of proof, in the late editions of Mr. Bourne's books.

Sand Paper.—We notice in the Fair a variety of samples of sand paper of a superior quality, made by Jones & Cromwell, of Brooklyn, N. Y. The grain is very uniform, sharp, and the paper tenacious. We understand that these makers are using new and peculiar mechanism, which improves the production and facilitates the manufacture.

Scientific American.

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VOL. XVII., No. 15....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, OCTOBER 12, 1867.

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(Illustrated articles are marked with an asterisk.)

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THE CREATIVE PRIDE OF THE MECHANIC.

If any form of pride is justifiable and proper it is that of production, or calling into existence. The author feels a pride in his successful book, the writer in the influence of his articles, the business man in the enterprise he has awakened, the wealthy man in the fortune he has accumulated. Each and all feel an honorable pride in their own agency in achieving success. But none of them can feel the thrill of satisfaction which belongs to the mechanic or the inventor.

The author and writer have used only the means already prepared and needing only arrangement. This arrangement of words, phrases, and sentences, is their "style," and rarely can they justly claim the enunciation of original ideas. The human mind, in some age, has evolved them, in some form, before they reproduced them. They may, by giving them a new dress, or presenting them from a new point of view, add to the force or intensify the effect, but rarely is the writer a creator.

The same is true of the successful business man, and the accumulator of fortunes. They simply use the means provided at their hands, means in most cases already prepared and needing only the directing power of judgment and the controlling power of will.

But the mechanic, from misshapen materials constructs the noble edifice the storm-defying ship, and the thousand machines which become co-laborers with him in aiding the progress of the race. He, from crude matter, eliminates the moving, acting, almost intelligent machine, which performs the labor of hundreds of human hands in a better manner than those hands could do even aided by brains. He has the advantage of the thinker or writer in seeing, in palpable form, the result of his labor in beholding its action, and estimating its value. No producer could have enjoyed a higher degree of satisfaction than Fulton when his first steamboat successfully stemmed the current of the Hudson. What could have equaled the pride of Watt when his engine was fairly at work doing the labor of a hundred horses?

The author waits sometimes years for an evidence of the public's appreciation of his labors. He is open to criticism. Envious or prejudiced cynics charge him with plagiarism or pirating, or with lack of originality or talent Often no return of material profit succeeds his labor. He may be assured in his own mind that his production is meritorious, but he may find it difficult to convince others of the fact. He is compelled to appeal to the tastes and prejudices of others or to their appreciation of the truth; and possibly he is so far ahead of the demands of his time that he must wait for his utterances to do the work of educators before he will be understood and rewarded, and that reward may never come to him in this life.

The journalist is in a worse condition. A caterer to the present wants and changing caprices of the whimsical public, he may be unduly flattered on the one hand, or unjustly blamed on the other, or he may be tempted to use his position and prostitute his talents to the work of sustaining a rotten project or assisting in the designs of unprincipled and ambitious schemers. His work is constant and mainly secret and unknown. Few give him credit for aiding in some measure of public advantage or social reform, but rather claim for themselves the origination of the movement or the credit of giving practical form to his suggestions. He seldom knows whether his labor has been of effect or not and if he does ascertain that it was the moving power he is seldom personally benefited.

But the mechanic appeals directly to a powerful element, the material needs of the race. He constructs a machine which saves labor and gives those who introduce and use it the means of wealth. The crude material, shapeless and inert, becomes, under his hand and by the exercise of his skill, formed, finished, and endowed with life. It is a portion of himself and obeys his will, Even if envious detractors seek to rob him of the credit of his invention or skill his success contrasted with their failure is a sufficient refutation of the slander, and he can rejoice in the consciousness that others acknowledge his merits and appreciate his labors. Beside he has the gratification of seeing his creation grow day by day under his hands and in witnessing the ultimate full success of his endeavor. We doubt if any pursuit is more generous in its returns than that of the mechanic, not only in its material returns, but in the satisfaction its success offers to the workman.

PHYSIOLOGY OF INVENTION.

It is a suggestive thought that the mind is more constitutionally adapted to the power of invention than it is to any other characteristic of being. The child is always inquiring, the youth, imitating, and the man, inventing. The vocation of life does not seem to alter these conditions. An active, energized mind habituated to thought, in its abnormal state, is capable of original conceptions. We have seen in dreams what we could not conceive while awake, and no principle appears to be more strongly marked as a propensity of the mind than its ever wakefulness to new thoughts and ideas. The deeper study which involves the walks of science, culling here and there a beautiful flower, is attended with fixed physiological principles worthy to be observed. One of these is the economy of the blood in its relation to the brain. The brain is always in motion. When an effort of memory is required there are conditions to be filled before it can be made to serve. The slightest thing we perfectly remember is away from us in a moment, if we are interested in viewing something else, hence we say "wait a moment," and presto! it is there. What is the cause or the servant that brings up this memory? It is the blood which by an effort of the will replenishes the organs necessary for service. A student of theology could not tell his age on being suddenly asked the question. One of two gentlemen called to see a lady of uncommon personal attractions who came herself to the door she asking the former gentleman his name entirely unlooked for by him, he turned to his friend very much agitated "what in the devil is it?" But the ability of the mind to serve in this respect is more apparent to us when we ask for time to recall an almost obliterated impression, and that may be the work of several hours. It is then that the long laborious process of revocation begins, which gives the brain the full benefit of all the blood it can command. It does appear that the same law governs the exercise of our other faculties. It is necessary to be in undisturbed quiet. The sacred injunction to devotion was when you have gone into the closet, "shut the door." It is indeed an indispensible condition that the whole mind be diverted from all other objects, and its concentration upon this one for moments or hours until the whole system is wrought up to the acme it is desirable to obtain. A single effort of this kind is worth more than a thousand hours amid the occupations of life eating and drinking and thinking at the same time while the poor stomach at the loss of the blood to the brain becomes dyspeptic, or the brain for use of the nervous power without sufficient blood, giving headache, and the body itself wreaking under the general disorder, makes the whole man sick and faint. When a man eats he wants the blood to help digestion. When he sleeps he wants it to be at comparative rest, and as it is the steam which works the engine of the mind give it its time and its place.

THE COMBUSTION OF PETROLEUM BY THE RETORT SYSTEM.

We notice, in the columns of a cotemporary, a letter on the combustion of petroleum by the retort system, criticising the views of its editor on the same subject.

The chemistry of the writer of this letter is quite novel, and perhaps our readers may be interested as well as instructed by a glance at this unique view of the combustion of hydro-carbons.

The writer says, "I will describe the process: As the oil flows out of the pipe it falls upon the red hot bottom of the retort, and is vaporized. This vapor, which, it will be remembered, is a chemical combination of oxygen and hydrogen, at a temperature which renders it easily decomposed if brought in contact with chemical substances for which either of its constituents have much affinity. In this case, the oxygen has a stronger affinity for the carbon of the vapor, to an extent sufficient to form carbonic oxide, than it has for the hydrogen of the superheated steam; and, similarly, the carbon has a stronger affinity for the oxygen, than it has for the hydrogen of the oil vapor; they consequently unite forming carbonic oxide, each setting free the hydrogen with which it had been previously combined."

Thus, it is assumed, that enough steam is put into the retort, if decomposed, to form the combinations, which this writer not only asserts are made, but which it appears was the problem he propounded to himself at the outset.

Of course, the decomposition of the steam blown into the retort is simply imaginary, there is no evidence given to prove that such is the fact; but, on the contrary, if the statement of the temperature given is correct, and we assume it to be so, no such decomposition takes place, and this decomposing and recomposing theory falls to the ground. The statement that the oxygen (from the decomposed (?) steam) has an affinity for the carbon of the vapor, which he says is composed of "oxygen and hydrogen, to an extent sufficient to form carbonic oxide," is mere chemical *hocus pocus*. The reason that carbon, under any circumstances, combines with oxygen in the proportion to form carbonic oxide, is due to the existence of a proper temperature and the presence of a proper quantity of oxygen; and the statement that "the carbon, which is part of the oil vapor, has stronger affinity for the oxygen than it has for the hydrogen of the oil vapor," renders his views still more foggy.

In short, after imagining the decomposition of the hydrocarbon and the steam, in a closed retort, instead of readjusting themselves back again into the combinations they had just been decomposed from, the carbon combines with the oxygen and sets free the hydrogen from both. That is his "theory."

This writer remarks: "The process just described is a cooling one, a great deal of heat being rendered latent (how much?) by the decomposition(?) of the steam, and *none gained* by the union of the oxygen and the carbon, in the formation of carbonic oxide."

As a matter of fact, a great deal of heat is generated when carbon and oxygen unite in the proportions to form carbonic oxide; the original discovery that "no heat is gained," exhibits still more plainly the extraordinary nature of the imaginary *hocus pocus* asserted to be going on inside of this mysterious retort.

The contents of the retort having been adjusted, as per hypothesis, "the proper quantity of air to convert this carbonic oxide into carbonic acid, and the hydrogen into water, is now admitted; and as the mixture of the air and the two gases issue from the burners, it is ignited by the heat of the flame, and the combustion is complete."

But in a few lines before this writer had declared that, in the union of carbon and oxygen, in the formation of carbonic oxide, "no heat is gained;" now he asserts that, by the combination of the carbonic oxide with another equivalent of oxygen, "the combustion is complete," which of course means the highest attainable heat with a given quantity of combustible matter.

So, according to his conception of combustion, while the formation of C. O2. (carbonic acid) is perfect combustion, and produces intense heat, partial combustion, or the formation of C. O. (carbonic oxide), produces no heat at all!

FAIR OF THE AMERICAN INSTITUTE.

This exhibition is now in very successful operation. When the visitor first enters, especially if he be a stranger, the effect of the scene is bewildering. Along the whole northern side of the principal hall are lines of shafting driving a crowd of machines of almost every conceivable description. The whirr, the hum, and the bustle is confusing, but to the practical man is very pleasing. It is gratifying to see the interest manifested by ladies [illegible] and to the engineer, machinist, and manufacturer, the exhibition is a school of pleasing instruction.

In the annex adjoining the machine department are the boilers which furnish steam for the engines. Several of them are somewhat unique. The Root boiler is a series of wrought iron pipes cut to the length of the boiler desired, and placed in parallel rows, both vertically and horizontally. On each end of each pipe is screwed a square block, and, as their edges fit to adjoining blocks, together they form the ends of the boiler when completed. Each of these blocks has sockets which receive return bends that connect each pipe with the one below and above. A cross pipe (steam space), connects the sections at the top of the front end and a similar pipe (water space,) connects them at the bottom back end. The boiler is set at a downward inclination from front to rear of about three inches to the foot. John B. Root, 500 Second ave., corner 28th street this city is the patentee, and he claims for this boiler "absolute safety from explosion; economy in fuel, weight, room, and cost, accessibility for repairs and facility for enlarging when the necessities of business require." He affirms that there can be neither foaming nor priming. The boiler is evidently a rapid generator of steam.

There are several of Davis' Patent Super-heating Boilers in the exhibition. These boilers are very simple in construction and lay claim to peculiar excellence mainly for their superheating arrangements. They are upright tubular boilers the tubes being arranged in concentric circles. The tops of those nearest the center are partially closed by caps with a small central hole while the outer ones are open to the smoke box. The object of this arrangement is to throw the heat outward against the greatest body of water, which is contained in the space between the tubes and the shell. Above the top tube sheet is a central steam dome surrounded by a circle of cast iron hollow spheres connected to one another by pipes, except two, one of which receives the steam from the dome and the other discharges it to the engine. The steam after leaving the dome makes the circuit of the spheres thus becoming somewhat superheated, as claimed by the manufacturers one hundred degrees above the ordinary temperature and increasing its expansive force fully one-third. It is an easy working boiler and quite a favorite.

Perhaps no boiler attracts more attention than the "Gerner boiler." It is quite a curiosity. The shell contains a cone shaped cylinder, the small end over the grate, and inclined so that the top longitudinal line is level. This incloses a similarly-formed tube or cone of a diameter sufficient to leave a space of three inches all around its outer surface. The exterior cone is not entire, but has a longitudinal opening on its top, the two sides of the apperture being connected by straps.

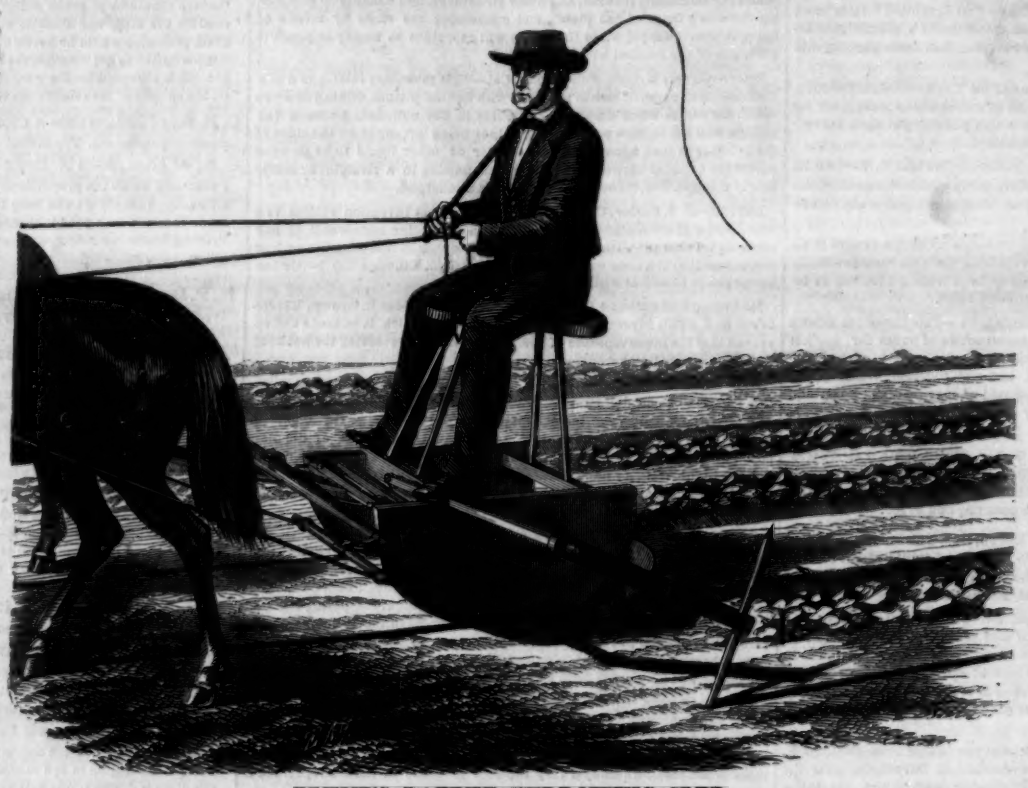
The inner cone is the steam chamber and the space between the two contains water up to a certain hight. Communication between the two is by means of one or more double pipes which lead the steam made in the water space into the

Device for Marking and Furrowing Land for Corn.

The inventor of this device claims that it does its work easier and more effectually than others; that it does not harden the soil, and thus hinder the germination of the seed; that it can be driven within a few feet feet of the fence, and be easily turned; and that it is cheap, being manufactured at a cost so low as to bring it within the reach of all.

As seen, it is in form very like a boy's sled, the runners being three and a half or four feet apart, according to the width of the rows. The runners are shod with iron, two inches wide, by one thick. At the rear of these runners, on the outside, is attached a mold board, or share of cast iron, for making the furrows. Pivoted to the center of the front cross-piece of the sled is an arm, projecting from the side of the sled, and carrying a bar and pointed marker for determining the line of the furrow next to be formed. The depth of this mark may be controlled by the driver's foot. His seat is so arranged that, by sitting further forward or back, he may, by thus elevating or depressing the back end of the sled, regulate the depth of the furrows plowed by the shares. Farmers will readily understand the operation of this implement without further description.

It was patented February 18, 1866, by Joseph Plumb, who may be addressed relative thereto at Flemington, N. J.



PLUMB'S PATENT FURROWING SLED.

Discoveries in Palestine.

The secretary of the Palestine Exploration Fund writes to the London *Times*:—

"When the committee of the Palestine Exploration Fund sent out their second exploring party to the Holy Land in January last, under the charge of Lieutenant Charles Warren, Royal Engineers, they gave him a general instruction to make Jerusalem his head quarters, and to excavate, and investigate about the city as much as possible, especially in the sacred enclosure of the Haram esh-Sherif. The result is that outside the walls of the enclosure he has made a discovery, which is almost, if not quite, as important as any that has ever been made in or about Jerusalem, and which cannot fail to be the fruitful parent of many more. He has found that the south wall of the Haram, which rears its venerable face to a height of eighty feet above the soil, descends to no less a depth than fifty-three feet below it—the solid rock of Mount Moriah, on which it is founded, being covered with that immense thickness of debris. Thus this wall must originally have stood at a height of one hundred and thirty feet above its foundations, fully justifying the expressions of Josephus, who says concerning it that 'if any one looked down from the top of the battlements into the valley he would be giddy, while the sight could not reach to such an immense depth.''

"The foundation and unworn masonry of the buried portion may be expected to disclose many a secret affecting these venerable walls, secrets which Lieutenant Warren is now diligently occupied in revealing. But this is not all. He found two other things. He found first, that the eastern wall was prolonged beyond the southern face, and continues in the general direction of Siloam, with all the solidity and antiquity, which characterize its known portions. How far it continues, or what are its exact direction and extent, I expect to hear shortly from Lieutenant Warren. He found, secondly, that below the debris a second south wall exists twenty feet distant from the known one, and of slighter workmanship. How far this wall goes, what its purpose may have been, its relations to the 'triple gateway' and the staircase which M. de Saulcy believed that he had discovered to descend from the triple gateway, how this discovery may affect the piers of the arches below the southeast corner of the enclosure, are questions which I await further information to be able to answer.

"Our operations are threefold:

"1. Exploration—On which I have only to add that we have already materials for almost an entire, complete, and accurate map of the country and photographs of more than three hundred spots and objects, large numbers of which have never before been taken.

"2. Geology—for this our desire is to send out a party, under the charge of Mr. Prestwich, F. G. S., the eminent geologis, who has most kindly offered his services.

"3. Botany and Zoology—for which in like manner we hope to avail ourselves of the services of the Rev. H. B. Tristram, well tried and well known already in the same field, and anxious like an old hunter, to be off on his final chase."

Condition of the Oil Regions.

A correspondent of the *Boston Transcript* thus describes the oil operations in Pennsylvania:—

"At Petroleum Center about one well in six is in operation. From the high hill west of the town you can see half a dozen villages and more than two thousand wells, some new, but many more utterly abandoned. On the top of this hill there is a fine flowing well which yields fifty barrels in a day—the only flowing well in all the region. The pumping wells yield from eight to thirty barrels in the day. A well that yields less than eight barrels will not pay for the working, even at the present advanced prices. The business has now passed entirely out of the hands of speculators, and is conducted in an orderly way, by 'solid' and intelligent men, and with improved methods.

"A very intelligent owner of some of the wells explained and illustrated to me all the process of getting the oil—from the first experiment with the auger to the final refining of the crude product; the boring through the various strata, the sand pumps, the seed bag, the casing, the rods which clear out the tube, the gas furnaces—the whole very interesting, but which it would be impossible to explain in the limits of a letter. Hardly any wood is consumed now for fuel. Some of the furnaces are fed by the escaping gas, but more by benzine, of which an ordinary engine furnace burns about a barrel in twenty-four hours. The sparks from a chimney would be dangerous in so explosive an atmosphere. Smoking is strictly prohibited in the neighborhood of the wells. But, as it is, fires are very frequent—hardly a week passes without them.

"The present high price of the oil is stimulating new enterprises, and the owners of wells are encouraged. You see the derricks rising on the tops of the hills, more than three hundred feet above the level of the railway. The gas is carried up the slopes in pipes for half a mile to make fuel for boring these new wells. Not one in three will strike oil at all, and not half of those who strike it will get it in profitable quantity. But the production is still very large, never, on the whole, greater than now. It is said that the famous Noble well, which has now done its work, yielded, before it expired, not less than four hundred and fifty thousand barrels of oil. It was sold for half a million of dollars."

KIDDER'S EUREKA TRAP FISH HOOK.

"Fisherman's luck" is merely a synonym for "just no luck at all." It is bad enough to have a provoking nibble, with no earnest and honest bite, but to have your bait taken repeatedly, and not secure your fish, requires some philosophy to bear with equanimity. The design of the hook represented in the accompanying engraving is to save the angler from these vexations, by surely securing the fish which has temerity enough to receive the barbs of this hook.

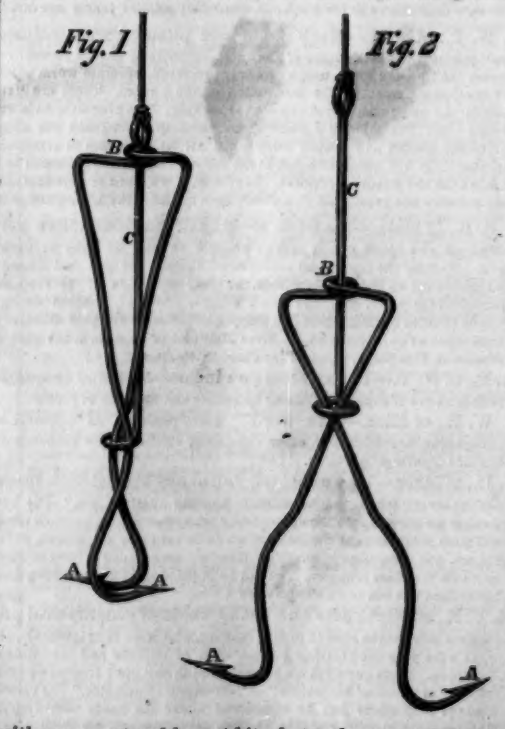


Fig. 1 shows the hook set or closed, and Fig. 2 the same sprung or open. The hook is a steel wire, the ends formed into points and barbs, A, and the center of the wire bent into an eye, B. Near the points the two arms of the wire are bowed outward, and, when sprung, as in Fig. 1, they cross or overlap. In this position they are held by a ring-clasp, C, to the upper end of which the line is attached. It is evident that a slight pull on the points, A, will slide the hook through the clasp, and allow its two sides to spring apart; of course, if the barbs are in the fish's mouth, this action will transfix the game, and hold it securely. It can be set instantly, by pushing down the clasp, and in the same manner it can be easily removed from the mouth of the fish. Its operation is readily comprehended from the foregoing.

Patented through the Scientific American Patent Agency, by Daniel Kidder, who may be addressed for the sale of the right at Franklin, N. H.

American Guns and English Armor.

If I have hitherto refrained from exposing the hollowness of the ground of self-gratulation in which some of our artillerists have been indulging, in consequence of the alleged failure of the American 15-inch gun to pierce an 8-inch plate although that plate had previously been pierced by some of our guns not of the largest size, it is because I expected that some communications from America would deal with the question in a more authoritive manner than any English spectator could do. I send you herewith an extract from the New York *Army and Navy* journal, of the 10th inst., which perhaps you may think it useful to lay before your readers, and meanwhile permit me to express my conviction that the theories so precipitately adopted with reference to the supposed inability of the 15-inch gun to pierce 8-inch plates are wholly erroneous, and must be abandoned by all who wish to preserve any reputation for a sound acquaintance with such subjects. The so-called American Mammoth powder is not the powder used in the American navy, and why was not the common 60-lbs. charge of American navy powder employed? The powder used in the American navy is somewhat stronger than the English powder, and as much as 100 lbs. of Mammoth powder has been burnt in the 15-inch gun without damaging the gun at all. Why then were such small charges of powder used in the English experiments, and why were not chilled shot tried? One would almost imagine that the main purpose of the experimentalists was self deception. Let chilled shot be used in the 15-inch gun with heavy charges of good powder, and it will be found that the shot will be projected with ease through a target representing the side of the strongest ironclad we have, whether built or building.—Vindicator in *Engineering*.

[We should add, however, that "mammoth-grain" powder has lately been adopted in the navy for the 15-inch and 20-inch guns. It is thought by some ordnance officers that the service charge will, before long, be increased enough to give 1600 feet velocity to the 15-inch shot.

We have published several articles intended to show that the trials of the American 15-inch gun at Shoeburyness were inadequate to prove its power, and we have before us now a letter from one of our ordnance officers which sustains the assertion of *Vindicator*. Our authority says: "We never now use in the 15-inch gun less than 100 lbs. mammoth powder. We get with that charge over 1,500 feet velocity." Comment is unnecessary. Since writing the above, a cable telegram informs us that, with 100 lbs. of powder, the 15-inch shot passed entirely through the 8-inch target.—Eds. Sci. Am.]

ERRORS IN SCIENTIFIC JOURNALS.

We notice in *Engineering* of September 13 a set of valuable tables on steamship performance. Referring to the steamship *La Plata*—mate to Cunard's *Arabia*—in three tables we find her length put down as 284 feet; we may be wrong, but we supposed she was some 100 feet longer than this.

Again, the weight of each of her wheels is set down at 37·5 tuns each. Is this correct, and, if not, how many more mistakes are there in these tables?

We allude to this because we have been annoyed to find errors, owing to negligent reading of proof, in the late editions of Mr. Bourne's books.

Sand Paper.—We notice in the Fair a variety of samples of sand paper of a superior quality, made by Jones & Cromwell, of Brooklyn, N. Y. The grain is very uniform, sharp, and the paper tenacious. We understand that these makers are using new and peculiar mechanism, which improves the production and facilitates the manufacture.

Scientific American.

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NEW YORK, SATURDAY, OCTOBER 12, 1867.

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THE CREATIVE PRIDE OF THE MECHANIC.

If any form of pride is justifiable and proper it is that of production, or calling into existence. The author feels a pride in his successful book, the writer in the influence of his articles, the business man in the enterprise he has awakened, the wealthy man in the fortune he has accumulated. Each and all feel an honorable pride in their own agency in achieving success. But none of them can feel the thrill of satisfaction which belongs to the mechanic or the inventor.

The author and writer have used only the means already prepared and needing only arrangement. This arrangement of words, phrases, and sentences, is their "style," and rarely can they justly claim the enunciation of original ideas. The human mind, in some age, has evolved them, in some form, before they reproduced them. They may, by giving them a new dress, or presenting them from a new point of view, add to the force or intensify the effect, but rarely is the writer a creator.

The same is true of the successful business man, and the accumulator of fortunes. They simply use the means provided at their hands, means in most cases already prepared and needing only the directing power of judgment and the controlling power of will.

But the mechanic, from misshapen materials constructs the noble edifice the storm-defying ship, and the thousand machines which become co-laborers with him in aiding the progress of the race. He, from crude matter, eliminates the moving, acting, almost intelligent machine, which performs the labor of hundreds of human hands in a better manner than those hands could do even aided by brains. He has the advantage of the thinker or writer in seeing, in palpable form, the result of his labor in beholding its action, and estimating its value. No producer could have enjoyed a higher degree of satisfaction than Fulton when his first steamboat successfully stemmed the current of the Hudson. What could have equaled the pride of Watt when his engine was fairly at work doing the labor of a hundred horses?

The author waits sometimes years for an evidence of the public's appreciation of his labors. He is open to criticism. Envious or prejudiced cynics charge him with plagiarism or pirating, or with lack of originality or talent Often no return of material profit succeeds his labor. He may be assured in his own mind that his production is meritorious, but he may find it difficult to convince others of the fact. He is compelled to appeal to the tastes and prejudices of others or to their appreciation of the truth; and possibly he is so far ahead of the demands of his time that he must wait for his utterances to do the work of educators before he will be understood and rewarded, and that reward may never come to him in this life.

The journalist is in a worse condition. A caterer to the present wants and changing caprices of the whimsical public, he may be unduly flattered on the one hand, or unjustly blamed on the other, or he may be tempted to use his position and prostitute his talents to the work of sustaining a rotten project or assisting in the designs of unprincipled and ambitious schemers. His work is constant and mainly secret and unknown. Few give him credit for aiding in some measure of public advantage or social reform, but rather claim for themselves the origination of the movement or the credit of giving practical form to his suggestions. He seldom knows whether his labor has been of effect or not and if he does ascertain that it was the moving power he is seldom personally benefited.

But the mechanic appeals directly to a powerful element, the material needs of the race. He constructs a machine which saves labor and gives those who introduce and use it the means of wealth. The crude material, shapeless and inert, becomes, under his hand and by the exercise of his skill, formed, finished, and endowed with life. It is a portion of himself and obeys his will, Even if envious detractors seek to rob him of the credit of his invention or skill his success contrasted with their failure is a sufficient refutation of the slander, and he can rejoice in the consciousness that others acknowledge his merits and appreciate his labors. Beside he has the gratification of seeing his creation grow day by day under his hands and in witnessing the ultimate full success of his endeavor. We doubt if any pursuit is more generous in its returns than that of the mechanic, not only in its material returns, but in the satisfaction its success offers to the workman.

PHYSIOLOGY OF INVENTION.

It is a suggestive thought that the mind is more constitutionally adapted to the power of invention than it is to any other characteristic of being. The child is always inquiring, the youth, imitating, and the man, inventing. The vocation of life does not seem to alter these conditions. An active, energized mind habituated to thought, in its abnormal state, is capable of original conceptions. We have seen in dreams what we could not conceive while awake, and no principle appears to be more strongly marked as a propensity of the mind than its ever wakefulness to new thoughts and ideas. The deeper study which involves the walks of science, culling here and there a beautiful flower, is attended with fixed physiological principles worthy to be observed. One of these is the economy of the blood in its relation to the brain. The brain is always in motion. When an effort of memory is required there are conditions to be filled before it can be made to serve. The slightest thing we perfectly remember is away from us in a moment, if we are interested in viewing something else, hence we say "wait a moment," and presto! it is there. What is the cause or the servant that brings up this memory? It is the blood which by an effort of the will replenishes the organs necessary for service. A student of theology could not tell his age on being suddenly asked the question. One of two gentlemen called to see a lady of uncommon personal attractions who came herself to the door she asking the former gentleman his name entirely unlooked for by him, he turned to his friend very much agitated "what in the devil is it?" But the ability of the mind to serve in this respect is more apparent to us when we ask for time to recall an almost obliterated impression, and that may be the work of several hours. It is then that the long laborious process of revocation begins, which gives the brain the full benefit of all the blood it can command. It does appear that the same law governs the exercise of our other faculties. It is necessary to be in undisturbed quiet. The sacred injunction to devotion was when you have gone into the closet, "shut the door." It is indeed an indispensible condition that the whole mind be diverted from all other objects, and its concentration upon this one for moments or hours until the whole system is wrought up to the acme it is desirable to obtain. A single effort of this kind is worth more than a thousand hours amid the occupations of life eating and drinking and thinking at the same time while the poor stomach at the loss of the blood to the brain becomes dyspeptic, or the brain for use of the nervous power without sufficient blood, giving headache, and the body itself wreaking under the general disorder, makes the whole man sick and faint. When a man eats he wants the blood to help digestion. When he sleeps he wants it to be at comparative rest, and as it is the steam which works the engine of the mind give it its time and its place.

THE COMBUSTION OF PETROLEUM BY THE RETORT SYSTEM.

We notice, in the columns of a cotemporary, a letter on the combustion of petroleum by the retort system, criticising the views of its editor on the same subject.

The chemistry of the writer of this letter is quite novel, and perhaps our readers may be interested as well as instructed by a glance at this unique view of the combustion of hydro-carbons.

The writer says, "I will describe the process: As the oil flows out of the pipe it falls upon the red hot bottom of the retort, and is vaporized. This vapor, which, it will be remembered, is a chemical combination of oxygen and hydrogen, at a temperature which renders it easily decomposed if brought in contact with chemical substances for which either of its constituents have much affinity. In this case, the oxygen has a stronger affinity for the carbon of the vapor, to an extent sufficient to form carbonic oxide, than it has for the hydrogen of the superheated steam; and, similarly, the carbon has a stronger affinity for the oxygen, than it has for the hydrogen of the oil vapor; they consequently unite forming carbonic oxide, each setting free the hydrogen with which it had been previously combined."

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In short, after imagining the decomposition of the hydrocarbon and the steam, in a closed retort, instead of readjusting themselves back again into the combinations they had just been decomposed from, the carbon combines with the oxygen and sets free the hydrogen from both. That is his "theory."

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FAIR OF THE AMERICAN INSTITUTE.

This exhibition is now in very successful operation. When the visitor first enters, especially if he be a stranger, the effect of the scene is bewildering. Along the whole northern side of the principal hall are lines of shafting driving a crowd of machines of almost every conceivable description. The whirr, the hum, and the bustle is confusing, but to the practical man is very pleasing. It is gratifying to see the interest manifested by ladies in this department, and to the engineer, machinist, and manufacturer, the exhibition is a school of pleasing instruction.

In the annex adjoining the machine department are the boilers which furnish steam for the engines. Several of them are somewhat unique. The Root boiler is a series of wrought iron pipes cut to the length of the boiler desired, and placed in parallel rows, both vertically and horizontally. On each end of each pipe is screwed a square block, and, as their edges fit to adjoining blocks, together they form the ends of the boiler when completed. Each of these blocks has sockets which receive return bends that connect each pipe with the one below and above. A cross pipe (steam space), connects the sections at the top of the front end and a similar pipe (water space,) connects them at the bottom back end. The boiler is set at a downward inclination from front to rear of about three inches to the foot. John B. Root, 500 Second ave., corner 28th street this city is the patentee, and he claims for this boiler "absolute safety from explosion; economy in fuel, weight, room, and cost, accessibility for repairs and facility for enlarging when the necessities of business require." He affirms that there can be neither foaming nor priming. The boiler is evidently a rapid generator of steam.

There are several of Davis' Patent Super-heating Boilers in the exhibition. These boilers are very simple in construction and lay claim to peculiar excellence mainly for their superheating arrangements. They are upright tubular boilers the tubes being arranged in concentric circles. The tops of those nearest the center are partially closed by caps with a small central hole while the outer ones are open to the smoke box. The object of this arrangement is to throw the heat outward against the greatest body of water, which is contained in the space between the tubes and the shell. Above the top tube sheet is a central steam dome surrounded by a circle of cast iron hollow spheres connected to one another by pipes, except two, one of which receives the steam from the dome and the other discharges it to the engine. The steam after leaving the dome makes the circuit of the spheres thus becoming somewhat superheated, as claimed by the manufacturers one hundred degrees above the ordinary temperature and increasing its expansive force fully one-third. It is an easy working boiler and quite a favorite.

Perhaps no boiler attracts more attention than the "Gerner boiler." It is quite a curiosity. The shell contains a cone shaped cylinder, the small end over the grate, and inclined so that the top longitudinal line is level. This incloses a similarly-formed tube or cone of a diameter sufficient to leave a space of three inches all around its outer surface. The exterior cone is not entire, but has a longitudinal opening on its top, the two sides of the apperture being connected by straps.

The inner cone is the steam chamber and the space between the two contains water up to a certain hight. Communication between the two is by means of one or more double pipes which lead the steam made in the water space into the

inner cone or steam cylinder from whence it is drawn to the engine. The circulation of water in this boiler appears to be as near perfection as possible, and its evaporating power is evident from the great fact that twelve and a half pounds of water has been evaporated by one of coal. We shall have occasion again to refer to this generator.

Two large engines, one in each corner of the room, furnish most of the power to drive the machinery, although there are a number of smaller engines on exhibition. The engine in the eastern corner is from the Washington Iron Works, Newburg, N. Y., and has Wright's patent variable cut-off, which is worked by the governor. The engine is finely finished and performs its work noiselessly. The valves are poppet valves, operated by trippers. Except their working, the machine is almost perfectly noiseless. We have not yet seen any cards taken from the engine. It is to be soon indicated.

At the other end of this division is an engine from the Hope Iron Works, Providence, R. I., called the Babcock & Wilcox Engine, that runs the western half of the machinery section. It is externally very simple in appearance, and the valve motions are governed by the regulator, as in the other machine. Slide valves instead of poppet valves are used in this engine, a circumstance which may commend this engine to many mechanics. It is certain that the engine performs its work with great smoothness and perfect regularity, a statement that is worthy notice when the circumstances of its work are taken into consideration.

We have not time further to particularize the objects exhibited, only to advise those whose time will admit of a detailed examination, to visit this exposition of the arts, and those who cannot spare that necessary time, to take at least a leisurely walk through the immense building.

SALT IN THE ANIMAL SYSTEM.

In No. 13, current volume, we copied a brief paragraph from a medical journal which denounced the use of salt as a condiment, stating that it was "never useful; always injurious." The following will show that "doctors disagree:"

Herr Schultz, a chemist of Berlin, claims, after long and patient researches to have found the cause of electricity in human bodies. He attributes it to the presence of chloride of sodium, or common salt, in the system. In his experiments he asserts that the amount of electricity was always in direct proportion to the quantity of chloride of sodium found in the tissues. He would advise, therefore, all invalids suffering for electricity in the system to use salt liberally with their food, and to avail themselves freely of the benefits of ocean breezes and baths.

There can be no reasonable doubt of the benefit of salt to the human body. It would seem as superfluous to discuss the propriety of using common salt with our food as to argue the healthfulness of water or bread, as salt has been almost universally used by both men and animals since the creation of the world. "Salt," says the *Encyclopædia Britannica*, "forms an essential constituent of the blood, the loss of saline particles therefrom by the secretions, the tears, the bile, etc., being repaired by the use of common salt as a condiment." And further, "The gastric juice of the stomach contains free hydro-chloric acid, which is doubtless derived from salt taken with food." In *Brande's Encyclopædia* is the following statement: "Salt is next to bread the most important necessary of life." *Stockhardt's Chemistry* says: "We find common salt everywhere in nature, because it is indispensable to the life of animals and plants." In fact and in short, digestion and even life itself would cease were it not for the presence of salt in the human system.

Indestructible Railway Sleepers.

Numerous attempts have been made to render the timber sleepers on railways more durable by enabling them to resist the destructive action of damp and moisture. Experience has shown, however, that the results produced have not been proportionate to the extra cost incurred. The average length of prepared sleepers has been found to be about five years, or, considering the additional cost, showing but a slight increase of longevity over the timber in its natural state. Some of our railway managers have accordingly decided upon abandoning the use of prepared sleepers on their lines. A process of indurating has, however, been brought under our notice during the last week which promises results of a most satisfactory character, and which is well deserving the attention of managers of our railways. The inventor of the process is Colonel Szerelemy, whose name is well known in connection with the preservation of portions of the stone of the new Houses of Parliament. The material employed possesses, we are informed, qualities in many respects identical with that which has so remarkable an effect upon the surfaces of stone. Applied to timber the preservative effects are very remarkable, as instanced in the specimens which were submitted to the inspection of a number of scientific gentlemen last week. They were treated by the process in 1851, and were shown in the exhibition of that year.

Like many other germs of great inventions, which were passed over unnoticed at that time, these prepared sleepers did not attract the attention which they deserved. Besides, being but newly treated, the inventor, though perfectly convinced of the completeness of the induration which he had effected, could not appeal to that test of experience which is considered alone sufficient to satisfy the minds of practical men. When the sleepers were removed from the exhibition building they were buried in the ground, and, if not wholly orgotten, they have been, at least, undisturbed, until the recurrence of the exhibition at Paris has directed anew the attention of Colonel Szerelemy to the existence of those sleepers of sixteen years ago. The timbers were accordingly unearthed, and to the surprise of many, though certainly not of the inventor himself, the timber is as sound as on the day when it first came into his hand. The sleepers thus prepared are now on view at the Albion Works, Battersea, and managers of railways and of other public works, who really desire to keep down working expenses, would do well to pay a visit to the place, and ascertain for themselves the value of this mode of treatment. We believe that some astute Americans, who have profitted by their visit to the Paris exhibition, have within the last week purchased the rights of the inventor for the United States.—*London Railway News.*

Art and Science.

The Jaquard loom and the lace weaving machines of Nottingham, together with the numerous inventions for weaving or knitting stockinett—the machines with which our carpets are wrought, demand our admiration, and we feel proud that our social institutions have led to results so satisfactory. The recent improvements in the manufacturing of dyes, yielding colors so pleasing to the eye, from substances formerly considered waste, is surprising to all of us, even though we know the various steps by which the discoveries have been made. But with all our boasted progress it is doubtful if we have in all respects surpassed some of those nations which we regard as half civilized. M. Huc speaks of seeing in Central China, some thirty years ago, a cast iron figure of one of their Grand Lamas, weighing at least 25 tuns, so nicely cast, that although in about 80 pieces, yet it had the appearance of a solid casting. And it is well known that in architecture, some of the cities of Northern India are not surpassed by anything European. The beautiful light fabrics made from the fibrous blades of the pineapple, by the unaided fingers of the Persians, are well imitated by Europeans, but not surpassed in lightness and evenness of texture. To rival the famous shawls of Cashmere, they have produced articles worthy of admiration, but they fall short of the productions of the original makers. The amount of labor the finer shawls of Cashmere represent, makes it impossible for Europeans to compete with Asiatics, even if the patience and skill were equal. The Vale of Cashmere will stand unrivalled in this particular line of production until labor become so cheap in other countries, or society there receives some impulse which shall raise the price of labor to an equality with the rest of the world. There has been many efforts to produce the material in other countries, but the quality quickly deteriorates when the animal is removed from the peculiar clime of its native vale. Even a short distance changes the quality of the fibre, so much, that to prevent imposition the Maharajah has taken the inspection of the shawls into his own hands, so that now the inferior goods of the adjacent districts cannot be sold under the well earned reputation of real Cashmere. There is a capacity to take colors in the real Cashmere that is a distinct mark to those acquainted with the goods, and the success of the dyers must also be due to some cause not yet fully understood outside of the craft. The pride in which we are apt to wrap ourselves, upon contemplation of the vast progress everywhere visible over Europe, grows thin upon comparing the effective grouping of colors so exquisite in their individual shades, and the perfection of workmanship upon a fine Cashmere, with the product of our looms; and we wonder how a people whom we consider so low in our scale of civilization, can be so high in the arts which constitute our especial pride.—*London American.*

Tempering Steel Springs.

When it is required to harden small spiral springs which are made of steel wire, or springs for locks, or any of the other kinds of slight springs, they will require to be uniformly heated to a cherry-red heat, and then immersed in cold oil (not oil which has been long in use and become thick), and entirely quenched. Springs of a medium thickness will be the better for being cooled in water, the water being previously heated to about 60° of heat, and the surface of which should be covered with a film of oil. The thickest kinds of springs will be the better for being cooled in pure water heated to about 70° of heat. Springs require to have the greatest amount of elasticity given to them; consequently, they will, after they are hardened, require to be tempered. They may be tempered separately by smearing them over with oil or tallow and then holding them over a clear fire, or in a hollow fire, or in the inside of a piece of large iron pipe inserted in the midst of the ignited fuel of an open fire, and uniformly heating them until a white flame burns upon them, or, in other words, until the grease burns off with a blaze. If it is a spiral spring (or any other kind of spring which is not thicker at the ends than at the central part) which is being tempered, and which is shorter in its length than the length of the fire, it will be very apt to become heated at the extreme ends first; consequently, as soon as the two ends arrive at the proper temperature (which is known by the grease taking fire) the spring must be immersed in oil: it must not be entirely quenched, but must be taken out of the oil again immediately, and then again exposed to heat. If the oil upon the ends take fire again sooner than the oil upon the middle part of the spring, it must then be immersed again in oil, and then again exposed to heat, and so on until the oil burns uniformly upon all parts; otherwise the spring cannot acquire a uniform temper. After the spring has become uniformly heated to the proper temperature, and the oil burns uniformly upon it, it must then be again immersed in oil, then taken out again immediately and allowed to become cool in the air of its own accord. It will then be fit for use. All kinds of springs, whatever their shape or whatever their size, may be tempered perfectly by this method. It must be borne in mind that there is but one certain temper which gives to steel its greatest amount of elasticity; consequently, the stiffness or pliability of springs must be regulated by the substance and shape of the steel from which they are made. A very convenient way of tempering a large quantity of small springs at once (they must of course, be previously hardened), and of heating them uniformly, no matter how irregular their shape, provided the heat is not too suddenly applied, is to bind a quantity of them together with a piece of iron binding-wire and then to put them into a suitable vessel with as much oil or tallow as will cover them. Then place them over a small clear fire, and slowly heat the whole. Just as the oil begins to boil the springs must be lifted out, when a white flame will burn uniformly upon the whole of them; they must then be immersed in cold oil,—they need not be entirely quenched, but they may be taken out of the oil again immediately and allowed to become cool in the air of their own accord, and when cool, they will be like those which have been blazed off separately over the fire, and fit for use. A separate spring may be attached to a separate piece of wire, which may be lifted out of the oil occasionally, to ascertain when the whole is at the proper heat, which is known by the white color of the flame upon the spring.

Large springs may be tempered by this method, but the time saved with large springs will not be sufficient to compensate for the waste of oil; consequently, it will be more economical to temper the largest springs by blazing over the fire.

It would be well for those who are not accustomed to the operation, before attempting to boil a large quantity of springs, to boil a single one in a small quantity of oil, and so make themselves acquainted with the proper temperature of the oil and the proper temper of the spring.—*Ede on Steel.*

The Mont Cenis Summit Railroad.

We have already noticed the completion of this great work of engineering, and the success of a trial trip made over the line a few weeks since. An English exchange furnishes us with the following interesting particulars additional to the brief cable announcement we previously published:

"A train, composed of an engine and two carriages, left the St. Michel station at 6:30 A. M., on the 21st of August. The morning was admirably adapted for the trip, the sun shining with great brilliancy upon the Alpine peaks and the numerous glaciers which are visible in different parts of the route.

"After leaving the deep valley in which St. Michel is situated, the line passes by a gradient of one in thirty to the Pont de la Denise, where an iron bridge spans the river Arcq, near the site of that which was carried away by the inundations of last year. As the little train passed the village of Fourneau, the workmen of the Grand Tunnel of the Alps turned out *en masse*, and, as at all other parts of the route, they were observed stooping down, and even endangering their lives for the purpose of inspecting the unusual mechanism of the engine for working on the central rail. The first very steep gradient, of one in twelve, was seen in passing Modane, and, foreshortened to the view, appeared on the approach as if impossible to surmount; but the engine, the second constructed on this system, had already proved equal to the task on the experimental line, and, clutching the central rail between its horizontal wheels it glided quickly up, under a pressure of steam not more than eighty pounds to the square inch, without apparent effort

"The progress was purposely slow, because no engine or carriage had previously passed over the line, and also to give opportunity for examining the works. The damages to the road on which the line was chiefly laid were found, to be substantiall repaired by the French government. The magnificent scenery around, and the waterfall near Fort Sessaillon, were much admired, as the sharp curves afforded different views, while passing on the edges of the deep ravines. The train entered Lauslebourg Station under a triumphal arch, having accomplished twenty-four miles of distance, and attained an elevation of two thousand one hundred feet above St. Michel, From this point the zigzags of ascent commence, and the gradients over a distance of four miles were for the most part one in twelve. Looking down from the train near the summit, as if from a balloon, four of the zigzags were visible at the same instant to a depth of two thousand feet. The power of the engine was satisfactorily tested in this ascent, and the summit was reached under salvos of artillery from an improvised battery, and amid the cheers of French and Italians who had gathered to welcome the English on the frontier.

"The engine came to a stand under a triumphal arch, at an elevation of 6,700 feet above the sea. Flags of the three nations, and a silk flag specially presented by Signor Ginaoli to Mr. Fell, waved over a sumptuous breakfast, also provided by that gentleman. The hospice, the lake, and the plateau of the summit, surrounded by snow-clad peaks and glaciers, rising to an elevation of from 10,000 feet to 13,000 feet were passed, and the portion of the descent commenced from the Grand Croix. The railway here follows the old Napoleon Road, which was abandoned long since for diligence traffic on account of the dangers from avalanches. Masonry-covered ways of extraordinary strength had here been speedily provided for the railway. The descent to Susa was a series of the sharpest curves and steepest gradients, on which the central rail had been continuously laid. The valley of the Dora, with Susa and the convent of San Michel, and even the Superga above Turin, visible for thirty miles in the distance, presented a magnificent panorama as the train wound through a clear atmosphere round the mountain side. The confidence of the party was manifested by their crowding round all parts of the engine, and they thoroughly enjoyed the ever changing scenes as they passed round the edges of the precipices. Susa was entered amid the acclamations of multitudes of spectators. Thus was completed a journey unexampled in its character, both as respects the steepness of gradients, the elevation of the summit level, and the difficulty with which the curves and precipices were overcome."

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING SEPTEMBER 24, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

69,061.—WASHING MACHINE.—Arthur Adair, Buffalo, N. Y.

1st, I claim the false ends, B B, combined with the pounder, P, through the connecting chords, r s, and operating substantially as herein specified.

2d, I claim the false ends, B B, combined with the rubber springs, r r, and operating substantially as herein set forth.

69,062.—BOOK COVER PROTECTOR.—Charles L. Alexander and Victoria A. Osborn, Washington, D. C.

1st, We claim the elastic bands or straps, a a, etc., to form an expansible connection for the two halves of the cover protector, substantially as described.

2d, The elastic bands or straps, b b, etc., in combination with the flap, c c, of center piece, C, and the folds, D D and G G, substantially as described and for the purpose set forth.

3d, Such a book cover protector or mode of covering bound books as by reason of its expansibility and extensibility may be adjusted to books of various sizes, substantially as described.

69,063.—BOSHES OF HEATING AND PUDDLING FURNACES.— William Batty, Lawrenceburg, Pa.

1st, I claim the bosh of a puddling or heating furnace cast upon a wrought metal water circulating tube or tubes, substantially as and for the purpose described.

2d, The water chamber of a puddling or heating furnace arranged on rails or ledges under the bottom of the puddling or heating chamber, substantially as and for the purpose described.

3d, The removable front plate of the bosh connected by tongues and grooves to the bosh, substantially in the manner and for the purpose described.

4th, The removable fire plate, D, fitted in a recess in the top of the front plate and held in place by tongues and grooves, substantially as and for the purpose described.

69,064.—METAL SLEIGH KNEE.—William D. Baughn, Milford, Mich.

I claim the tenon, D, with the slot, F, through which passes the bolt, above described.

69,065.—CHURN.—Samuel and Marion Bear, Versailles, Ohio.

We claim the slats or uprights placed substantially in the churn as shown in combination with the curved dasher, as set forth in the specification.

69,066.—BOOT SHANK LASTER.—C. W. Bliss and O. M. Adams, Milford, Mass.

We claim as our invention the said boot shank laster composed of the cam, A, the handle, B, and the shanked claw, C, arranged and applied together, as specified.

69,067.—EXTENSION NOZZLE AND VENTILATING OIL CAN.— William Bonner (assignor to H. M. Bayless), St. Louis, Mo.

I claim the lip, b, slide, c, and tube, d, when constructed and arranged substantially as shown and specified.

69,068.—DRAWER FOR FURNITURE.—Charles Brada, Newton, Mass.

1st, I claim the combination of the bearing, d e, in the frame or casing and the projecting, g, on the drawer, as and for the purpose specified.

2d, I claim the strip, f, as and for the purpose set forth.

69,069.—BOAT-DETACHING TACKLE.—J. M. Brooke, Lexing- ton, Va.

1st, I claim the hook, A, with a curved slot, b, substantially as and for the purpose described.

2d, The combination of the slotted loaded hook, A b, stand bolt, G, of a boat, and tackle block strap, k, constructed substantially as herein described.

69,070.—SLUICE GATE FOR DAMS OR LOCKS.—Felix R. Bru not, Allegheny, Pa.

1st, I claim in a sluice way in a dam, dock, lock or other hydraulic structures a hollow sluice gate furnished with a valve or valves for the admission or exit of water and so placed in a chamber or recess in the sluiceway, lock, or other structure furnished with apparatus for admitting the head of water into the chamber under the gate or emptying the chamber of water as to raise or lower the gate at pleasure, substantially as and for the purposes hereinbefore described.

2d, The standing pipe open at any required hight for the admission of water into the sluice gate in combination with the hollow sluice gate or float into which the pipe opens, constructed and operating substantially as described, for the purpose of closing or lowering the sluice gate automatically at the required stage of water, as hereinbefore set forth.

3d, The gates for sluices, docks, locks, and other hydraulic structures in combination with hollow floats so constructed with valves for the admission or exit of water as to raise and lower or open and close the gates at pleasure in the manner substantially as hereinbefore described and for the purposes set forth.

69,071.—CORN PLOW.—M. C. Buffington, La Harpe, Ill.

1st, I claim the bent axle, A, with the wheel arms, C, and draft pole, B, attached as shown in connection with the pulleys, d d e, and draft chain or cord, E, all combined and arranged to operate in the manner substantially as and for the purpose set forth.

2d, The attaching of the plow beams, F, to the axle, A, by means of the tubes, h g, the latter being fitted on rods, f, attached to the parts, c, of the axle and the former secured by pins, j, between plates, i i, at the front ends of the plow beams.

3d, The brace rods or bars, k, connected with the ends of the rods, f, and the rear end of the draft pole, B, substantially as and for the purpose specified.

4th, The combination of the axle, A, draft pole, B, brace rods or bars, k, and the universal joints which connect the plow beams with the axle, all being arranged substantially as and for the purpose specified.

69,072.—REIN SNAP.—P. L. Butler, Utica, N. Y.

I claim a rein snap having two springs, c d, or their respective equivalents, applied to it, so as to operate substantially as specified.

69,073.—MACHINE FOR CHOPPING MEAT.—Hiram Chamber- lain, Calais, Me.

I claim the combination as well as the arrangement of the slicing and mincing or chopping mechanisms substantially as specified, the slicing mechanism consisting of the rotary wheel with its slicing and cross-cut knives, the hopper and the wheel case, and the means of revolving the wheel and the mincing mechanism consisting of the rotary mincing tub, its reciprocating knife and mechanism for operating the two, as specified.

I also claim the combination of the adjustable shoe, K, with the hopper and the slicing wheel provided with the slicing and cross-cut knives, as described.

I also claim the combination and arrangement of the studs, g g, and the retainer or arched bar, s, with the frame, A, and the slicing wheel case, C, made in two parts and applied to the slicing wheel, as specified.

I also claim the combination and arrangement of the slider, u, and its guides, v v, with the mincing mechanism when connected with a slicing mechanism and so as to operate therewith, as set forth.

69,074.—NECK YOKE.—W. B. Chapman, Waukau, Wis.

1st, I claim the hinged metallic clasp, Fig. 2, when used in combination with the leather or other filling, b', substantially as and for the purpose set forth.

2d, The use of the hinged metallic clasps, C and D, or either, as and for the purposes set forth.

3d, The use of the clasps, B C and D, in combination with the neck yoke, A, as described for the purposes set forth.

69,075.—DUMPING WAGON BOX.—Geo. R. Clark, Livonia, N. Y.

I claim the construction and relative arrangement of the several parts, a d e f h and D, constituting a dumping wagon box, substantially in the manner and for the purposes herein shown and described.

69,076.—SEED PLANTER.—Nicholas Clute, Schenectady, N. Y., and Oliver W. Marshall, Columbus, Ohio.

1st, We claim a seed planter so constructed that when applied to the leg of a person the vibration of the leg or the bending of the knee in the act of walking will work the lever and operate the segment slides or valves and deliver the seed to be planted.

2d, We claim a hollow lever working on a pivot and carrying a perforated segment or slide to receive and deliver the seed into and through the lever, substantially as described.

3d, And in combination with the segment above claimed, we claim the perforated loose segment, P, between the segment, L, and the box.

4th, In combination with the delivering segment, L, we claim the stationary segment, Q, substantially as described.

5th, Also in combination with delivering segment, L, we claim the sliding segment, S, retaining and holding the seed when it is desirable to stop planting.

69,077.—BALANCED "HEAVE-UP" FOR ROLLING IRON.—Jo- siah Copley, Jr. (assignor to Josiah Copley, Sen.), Allegheny City, Pa. Antedated Aug. 17, 1867.

1st, I claim, combined with rolls for rolling iron, an improved balanced "heave-up," constructed and counterpoised substantially as herein described and for the purpose set forth.

2d, The combination of the platforms, C and C', frames, D, levers, i, arms, and counterpoise, b, with rolls for rolling iron, substantially as herein described and for the purpose set forth.

69,078.—SELF-ACTING VENT FOR CANS.—E. M. Crandel (as- signor to Lorette M. Crandel and E. T. Hollister), Alton, Ill.

I claim the vent or air duct, C, when applied to the can, A, in the manner and for the purpose described and shown.

69,079.—DRIVING BIT.—E. S. Dawson, Syracuse, N. Y.

I claim a bit having a stiff mouth piece constructed of twisted wire with a soft rubber covering, as herein represented and described as an article of manufacture.

69,080.—FORGING APPARATUS.—T. B. De Forest, Birming- ham, Conn.

1st, I claim the hammer, E and E', projected from the pistons and operated through the medium of the steam cylinders, C and D, arranged as described in combination with a vibrating or receding anvil, constructed and arranged so as to present a face to each hammer, substantially in the manner herein set forth.

2d, The arrangement described for operating the cut-off valve rods, H2 and H5, so as adjust the operation of the hammer or hammers, substantially as set forth.

3d, The bar, J, in combination with and carrying the feeding and cutting-off apparatus described, hinged to the frame so as to be turned from the anvil, I, substantially as herein set forth.

4th, The gage, L2, in combination with the feeding device, all constructed and operated substantially as and for the purpose specified.

5th, In combination with the slide, L, and clamping lever, L', I claim the gage, L2, arranged so as to be operated by the movement of the lever, L1, substantially as described.

6th, The combination of the two cutter heads, P1 and P2, with the slide, R', and the stud, R3, and cam, R, constructed and arranged so as to operate substantially as set forth.

69,081.—CULTIVATOR.—E. F. Dehast, Swan Creek, Ill.

1st, I claim the frame, A B G F, beams, D D D D, cross piece, M, rods, o o s s, connecting bar, r'', and levers, v'' v, constructed as described and for the purpose set forth.

2d, The levers, n'' n,'' in combination with the main frame and beams, D, substantially as described and for the purpose set forth.

3d, The cross piece, M, in combination with the rods, s s o o, and beams, D, substantially as described and for the purpose set forth.

69,082.—BOOT AND SHOE TIPS.—A. B. Ely, Newton, Mass.

I claim a molded shoe tip made of rubber mixed with groundings or other suitable fibrous material, substantially as described.

69,083.—PLOW.—J. D. Evans, Pleasant Hill, Ga.

I claim as my invention and desire to secure by Letter Patent the foot, A, and regulator, B, as pivoted with bolts at C, and clamped on both sides of the beam, D, at E and E', when arranged and combined as herein described and for the purposes set forth.

69,084.—HORSE HAY FORK.—Owen Evans, Alliance, Ohio.

I claim the lip, I, link, E, and T-shaped lever, F E', as arranged in combination with the shaft, B, provided with notch or mortise, H, and foot, C, for the purpose and in the manner as set forth.

69,085.—ROLLING APPARATUS FOR ROLLING CHAIRS FOR RAILROADS.—David Eynon (assignor to Tredegar Company), Richmond, Va.

1st, I claim the rolls grooved as described and shown in the drawings.

2d, I also claim the flattening rollers arranged in rear of the fifth groove, as described for the purpose set forth.

69,086.—BRACE FOR BORING BITS.—James B. Fellows, Con- cord, N. H., assignor to C. C. Jones, Portland, Me.

I claim the combination of the hook, B, bolt and nut, d, when the bolt is set vertically in the part, A, of a bit stock and the hook, B, rigidly attached to the said bolt, d, is employed to embrace and hold the borer, c, in the part, A, or release it therefrom, substantially as herein set forth and described.

69,087.—SNAP HOOK.—Kasson Frazer, Syracuse, N. Y.

I claim the constructing of a snap by a combination of the parts, A B C and D, or their equivalents, substantially as and for the purpose described.

69,088.—CHURN.—Jacob W. Gault, Pleasant Township, Ohio.

I claim the combination and arrangement of the balance wheel, treadle, adjustable connecting rod, churn body and dasher, when the several parts are constructed and operated as herein set forth.

69,089.—ANIMAL TRAP.—Joseph Haddleton (assignor to him- self and John Snow), Rochester, N. Y.

I claim the hinged strap or bail, b, in combination with the door, D, of animal traps for the purpose of automatically locking the same when closed, in the manner herein shown and described.

69,090.—MACHINE FOR FORMING THE EYES OF PICKS, ETC.— H. M. Hamilton, New York City.

1st, I claim the arrangement of the block, K, lever, K1, and bolt, K2, with the frame, H2, and cam, J, operating substantially as described.

2d, I claim the follower, E, acting upon the lower surface of the blank, in opposition to the descending punch and operated by the weighted lever, substantially as described.

3d, I claim the detaching and detaining devices for the lever, D', consisting of connecting rods, O O2, and lever, M2, which uncatch the chain drum and a pawl or latch, N, acting as a detaining trigger.

69,091.—LAMP.—Henry L. Hanson, Portland, Me.

I claim the arrangement of the removable metallic cone of the glass cylinder in the manner and for the purposes set forth.

69,092.—PUMP.—H. A. M. Harris, Philadelphia, Pa.

1st, I claim a double acting piston constructed substantially in the manner described, whereby I produce a continuous current through the piston by its reciprocation.

2d, The combination of the double acting piston constructed substantially in the manner described with the tubular piston rod, the pump cylinder and air chamber for the purposes set forth.

3d, The combination substantially in the manner described of the double acting piston head, with the tubular piston rods and cylinder for the purpose set forth.

69,093.—ROTARY CHURN.—John Harwood, Cobleskill, N. Y., assignor to himself and C. L. G. Blessing, Albany, N. Y.

1st, I claim the employment of a weighted box, B, in combination with a rotary churn dash as shown and described.

2d, The combination of weighted box, B, with a churn dash in combination with the adjustable frame, W, substantially as and for the purpose shown and described.

69,094.—WAGON SPRING.—B. Hershey, Erie, Pa.

I claim the use of the tortion spring with its attachments above described as applied to freight wagons or carriages of whatever kind to which they may be properly attached.

69,095.—HEMMING-GUIDE FOR SEWING MACHINE.—C. J. Hol- comb, Macon, Mo.

I claim the combination and arrangement of the slotted adjustable plate, A, tongue, B, set screws, C, folder, D D', hemmer, E, slide, F, and screw, G, all constructed and operating in the manner and for the purpose set forth.

69,096.—PREVENTING INCRUSTATION OF STEAM BOILERS.— J. L. Husband, Philadelphia Pa.

I claim the affixing absorbing or magnetic points and bars into and through the boiler shells with insulated cap, all as herein before described and substantially set forth.

69,097.—HOLDER FOR WHITE-WASH BRUSHES.—Anthony Lake, (assignor to himself and C. J. Walser,) Lancaster, Pa.

I claim the combination of the disk, A, provided with stationary pin, P, the notched or perforated disk, B, and the tightening screw, C, when constructed applied and operating substantially as described.

69,098.—MODE OF DYEING AND EMBOSSING TABLE AND PIANO COVERS.—Alexander Jack, (assignor to himself and Edward Brierly) Milton, N. H.

I claim my improvement in the manufacture of printed table cloths or other articles of like character the same consisting in the combination of the process of dyeing by frames as described with that of embossing or printing the material so dyed or those of embossing or printing at one and the same time as set forth.

Also the combination and arrangement of medallion or separate color resisting blocks, b b b, with the common plaid or stripe dyeing frames, a a, as described whereby the stripe or plaid dye frames may be used as occasion may require for dying cloth with grounds having undyed medallions, as set forth.

69,099.—SUB-SOIL PLOW.—M. R. Jones, Bradford, Wis

1st, I claim a sub-soil plow combined with a common plow so that the bottom of the preceding burrow may be plowed by the sub-soil plow immediately forward of the burrow slice that is being turned by the common plow substantially as and for the purposes described.

2d, Sub-soil plow, I, shank, K, with countersink therein substantially as described, thumb screw, p, bar, L, draft rod, C, and beam, H, when the whole are constructed together and used substantially as and for the purposes described.

3d, Beams, C and H, in combination with the devices, L k, and u and M d and e, and the equalizing bar, G, for the purpose of adjusting the distance between, C and H, substantially as and for the purposes described.

4th, A general arrangement and combination of the parts, P D G H K C I M and O, when the whole are connected together and used substantially as and for the purposes described.

69,100.—CURRY COMB.—Wm. P. Kellogg, Lansingburg, and Miles Sweet, Troy, N. Y.

We claim in a carry comb, a series of single comb-strips, A, having a base, b, turned on only one side of each comb-strip, when the bases of the comb-strips are arranged with their longitudinal edges, e f, close together and fastened by rivets, c, to a back plate, D, substantially as herein set forth.

We also claim, in a curry comb, a series of comb-strips having bases fastened by rivets, c, to a back plate formed with corrugations, k, along the longitudinal edges of the bases of the comb-strips substantially as herein set forth.

69,101.—MEANS FOR WINDING OR DELIVERING YARN FROM SPOOLS.—Robert Kershaw, Norristown, Pa.

I claim the combination of the cap, D, with a conical headed stationary spool as and for the purposes described.

69,102.—SEAT FOR CARRIAGES.—Charles P. Kimball, Port- land, Me.

1st, I claim supporting a jump seat such as is shown at d, when the same is in use, as the forward seat of a vehicle, by adjustable stops attached to the seat itself, the carriage body and operating against the posts of a carriage body and operating against the posts of a carriage, the supports of the seat, substantially as herein set forth and described.

2d, In combination with the pivoted supports, e, of the carriage seat and the adjustable stops, as described, I claim shortening the seat, d, so that it is capable of being placed in either of the three positions shown in fig. 1, substantially as described.

69,103.—WATCH KEY.—E. M. Kimball, Toledo, Ohio.

I claim a watch key constructed with a sharp edge or blade, b', substantially as herein set forth for the purpose specified.

69,104.—CAST IRON KNEE FOR SLEIGHS.—Benjamin Knapp, Bloomville, Ohio.

I claim the knee or brace, D, of cast or wrought metal secured to and combined with the frame and runner of a sled or sleigh by means of clips or bolts fitting in grooves along each side of the knee substantially as set forth.

69,105.—WHIFFLETREE.—John W. Larmore, Harrison, Ohio.

I claim the arrangement of the perforated stretcher, A a a', hooked rod, B b b', adjustable loop or hook, C c, and set screw, D, for the purpose set forth.

69,106.—SAFETY BRIDLE.—Elies W. Lindeman, (assignor to himself and M. S. and H. H. Harnish, Mannor Township, Pa.

I claim the arrangement and combination of the washer, D D', on the sliding loop, E, when formed out of the continuous strap, C C', forming the head stall and martingale of the bridle and passing through the same ring, A, of the bit all applied in the manner shown and for the purpose specified.

69,107.—ELEVATING AND CONVEYING DEVICE.—William Louden, Fairfield, Iowa.

1st, I claim an elevated track or railway, a, when suspended by means of ropes, chains, or other similar fastenings in combination with the travelling pulley, D, and hoisting tackle, H, all arranged to operate substantially in the manner shown and described.

2d, The arrangement of the uprights, B B, in combination with the bar, a, and ropes or chains, C C, substantially in the manner as and for the purpose set forth.

3d, Locating the pulley, M, independently of the track or railway, A, in a position elevated to such an extent that the counterpoise weight, W, will act as a support to the track substantially as set forth and described.

4th, The stop, S, on the rope, I, substantially for the purpose set forth.

5th, Attaching the pulley block, E, to the bar, A, in the manner shown and described and for the purpose set forth.

6th, The stop or block, L, having its inner end concaved, placed upon the bar, A, and used for the purpose specified.

69,108.—GATE.—H. Mansfield, Warsaw, Ind.

I claim the cam, D, having sharp projections, P P, for carrying a gate shut, and the short carves, K K, for holding it closed in combination with conical rollers, E E, arranged to turn in the projections, I I, substantially as set forth.

69,109.—CORN PLOW.—John Marsh, Seneca, Ill.

1st, I claim the slotted timbers, F F, with their holes, I I I I, and their tranions, G G, substantially as and for the purpose described in the foregoing specification.

The iron straps or loops, H H, at the ends of the plow beams, E E, in combination with the frame, A, substantially as and for the purpose described.

3d, The shovels, K K E K, with their upwardly projecting tail ends, substantially as and for the purpose described in the foregoing specification.

69,110.—SYRINGE.—Morris Mattson, New York City. Antedated Sept. 6, 1867

I claim the combination and use in syringes, consisting of an elastic bulb and discharge pipe merely without the combination of valves to regulate the admission and discharge of any fluid, of a flexible tube between the elastic bulb and discharge pipe substantially as and for the purposes set forth.

69,111.—HOUSEHOLD UTENSIL.—W. C. McGill, Cincinnati, O.

1st, I claim the curved cross plate or hilt, E, in combination with the knife A, and handle, D, made and constructed substantially as and for the purpose of a can opener and plate or pan lifter, as herein set forth.

2d, The corkscrew steel plates, G G, in combination with knife, A, hilt, E, and handle, D, the whole forming a combined can opener, plate lifter and knife sharpener as herein stated.

69,112.—BOOT-JACK AND BLACKING BRUSH.—H. J. Miller, Nashua, N. H. Antedated Sept. 8th, 1867.

I claim the metallic frames composed of the arms, A A, sides, D D, flanges B B, and handles, C C, constructed and hinged together as herein represented when used in combination with the brushes, F and F, as and for the purpose specified.

69,113.—COTTON BALE TIE.—J. F. Milligan, (assignor to him- self and J. W. Branch,) St Louis, Mo.

I claim the tie piece formed of the parts, A and A', having the mortice, a and a', respectively, and being joined by a central rail, a2, in the manner set forth when combined with and acting upon the band ends, B and B', substantially as and for the purpose described.

69,114.—MACHINE FOR RENOVATING AND CLEANING FEATH- ERS.—Ossian C. Monroe, Poultney, Vt.

1st, I claim the vessels, A B and C, when arranged concentric with each other and when provided with the tubes D, and steam pipes, e and f, all made and operating substantially as and for the purpose herein shown and described.

2d, The manner herein shown and described of arranging the tubes, D, to prevent the water from an inner revolving vessel into an outer vessel, by extending the inner end of the tubes to or near to the axis of the inner vessel, by arranging a tube, h, within its outer end, and by closing the outer end around the tube, h, as set forth.

3d, The arrangement of the tubes, e and f, hollow axles, d, and faucet or valve, g, all being made so that the steam can be at will conducted to, or discharged from the vessels, B or C, substantially as set forth for the purpose herein shown and described.

69,115.—TRUNK LOCK.—Niles Nard, Havre De Grace, Md.

1st, I claim the vibrating dog or piece, c, pivoted or hinged to the bolt plate for the purpose of retracting the same substantially as described.

2d, The combination of the vibrating dog or piece, c, spring catch, m, and spring lever, d, substantially as and operating in the manner set forth.

3d, The combination of the pipe stem, h, with the spring, G, carrying the stud, m, and dog, c, substantially as and for the purposes specified.

69,116.—FENCE.—A. M. Nichol, Granville, Ohio.

I claim the locking and supporting the panels as shown in position, by means of the base block, C, together with the post, F, brace, E, and clamps, D and L, substantially as described.

69,117.—PLOW.—William D. Nichols and Nelson W. Clark, Chicago, Ill.

1st, We claim attaching the sub-soil plow, C, to the land-side and beam of a plow, as described.

2d, The colter, D, as described.

69,118.—TREATING BONE BLACK FOR FILTERING SUGAR.— Chas. B. Orvis (assignor to John B. Davidson), St. Louis, Mo. Antedated Sept. 12, 1867.

I claim the defecating composition, prepared substantially as herein set forth.

69,119.—CARRIAGE TOP.—Peter Owens, Chicago, Ill.

1st, I claim the bow iron of a carriage top and seat-iron, B, when constructed substantially as described, and connected or jointed together by means of the strap, C, and screws, D, substantially as and for the purposes set forth.

2d, I claim providing the bow iron, A, with the piece, F, when constructed and operating substantially as and for the purposes described.

69,120.—COTTON-BALE TIE.—Clinton J. Paine, Painesville, O.

I claim the device, fig. 1, constructed with the wedge-shaped projection, C, and wedge shaped aperture, B, substantially as shown, and employed as a tie by using two of such devices inverted and reversed to each other, as explained, in combination with the hoop or band, D, as and for the purpose specified.

69,121.—MODE OF PRODUCING BLACK IN DYEING AND PRINT- ING.—Alfred Paraf, New York city.

I claim the process of producing black in dyeing and printing operations, by means of asphaltum and albumen, substantially as before described.

69,122.—SAWMILL HEAD BLOCK.—Darius Parkhurst, St. Louis, Mo.

1st, I claim the combination of the levers, E E1, pawls, h h1, spur gearings, G G1, shafts, D2, bevel gearings, D D1, and head blocks, C C, arranged in the manner described.

2d, I claim the lever, L, the cam, L1, with its crank, H, and the wheel, G, when combined and arranged in the manner and for the purpose set forth.

69,123.—CAR COUPLING.—H. C. Payson, Haydenville, Mass.

I claim the shackle, S, having three or more hooks, a a a, and operated by the lever, D, in combination with the buntar, S, having the corresponding entrances, c c c, arranged substantially as and for the purpose described.

69,124.—FAUCET.—John Phelps, Owego, N. Y.

1st, I claim the recessed chamber, A, strainer, B, and openings, C C, all constructed and arranged as and for the purpose specified.

3d, In combination with the elements of the first claim, I claim the air chamber, D, as and for the purpose set forth.

69,125.—SPRING FOR VEHICLES.—E. J. Post, Vienna, N. J.

I claim constructing elliptic steel springs by twisting the leaves or blades right and left so that the central portion is at an angle with the plane of the ends, thereby obtaining greater strength and elasticity, substantially as herein described.

I claim the metal seat or spring blocks, d d, constructed as and for the purposes specified.

I claim so securing the ends of duplex contra twist springs together as to prevent them from spreading apart under the pressure of a load, as herein described.

I claim connecting the joints at the ends of double springs, so that they may be adjusted to bear more or less weight, and also may be made to be more or less elastic by apparatus constructed and operating substantially in the manner herein described.

69,126.—PEN AND PENCIL HOLDER.—John T. Price, Arrow Rock, Mo.

I claim an improved mode of adjusting pens and pencils to their holders by means of the spring represented in fig. 3, by the letter x, and an improved mode of adjusting holders on the fore-finger by means of steel or gutta-percha castings, with grooves and notches, for the pens and pencils, represented in fig. 2, by the letter y, and with sectional springs represented in fig. 1, by the letter o, to clasp the finger, as also to permit two holders to be firmly united together as in figure B.

69,127.—FAN ATTACHMENT TO CHILDREN'S CARRIAGES.—J. Reinach, New York city.

I claim the combination, with a child's carriage, of a fan so connected to the running gear of the carriage that the required motion will be imparted to it during the progressive motion of the carriage, substantially as herein specified.

69,128.—MAGNETIC METAL SEPARATOR.—Peter Righter, Newark, N J.

I claim the cylinder, A, helices, b, magnets, c, segments, c, connecting plates, g and h, springs, j, when combined, arranged, and operated substantially in the manner and for the purposes set forth and shown.

69,129.—MEASURING FUNNEL.—Wm. H. Rodgers, Brook- lyn, N. Y.

I claim the cover and clamp, to attach to a faucet, in combination with the measure and funnel, provided with a valve, as and for the purpose specified.

In combination with said measure and valve, I claim the lever, K, connected to the cock for raising the valve, as set forth.

69,130.—SEED PLANTER.—John B. Seymour, Pittsburgh, Pa. Antedated Sept. 7, 1867.

I claim a seed planter consisting of the boxes, A and B, plunger, a, rod, b spring, g, and cut-off, d, all made and operating substantially as herein shown and described.

69,131.—BLOTTER HOLDER.—N. M. Shafer, New York city. Antedated Sept. 12, 1867.

1st, I claim the mode of securing a blotter to a frame and the latter to a book, substantially as and for the purpose herein set forth.

2d, The combination of beam plate, A, plate, B, hole, C, wire, F, hook, D, and bend, E, substantially as and for the purpose set forth.

3d, The employment of the elastic cord, H, or its equivalent, substantially as and for the purpose herein set forth.

69,133.—SWING.—John W. Sheaffer, Lockport, Ill.

I claim the adjustable handle, I, with its connecting bars, J J, when used in combination with the swing bars, C C C1 C1, and the seat, E, as and for the purpose set forth.

69,138.—FEED CUTTER.—George Small, Clayton, Mich., assignor to Harvey Williams, Otsego, N. Y.

I claim the combination of the several parts comprising this machine, when arranged as described and set forth for the purpose specified

69,134.—CIRCULAR GRATE FOR FURNACES.—Geo. L. Smith, Brooklyn, N. Y.

1st, I claim the construction of a circular grate of a series of segments or sections, B, surrounding a central section, A, substantially as described.

2d, The construction of the segments, B, with concentric and arched cross bars, B2, substantially as described.

3d, An independent central support for the section, A, and segments, B, of a circular grate, constructed substantially as described.

69,135.—HEAD REST FOR CHAIRS.—Henry Snowden, Baltimore, Md.

I claim the head rest, above described, composed of the rods, A and E, frame, C, movable block, D, and set screw, F, having the cushion supported by the arms, B B, all constructed and arranged substantially as and for the purpose specified.

69,136.—POTATO DIGGER.—Simon Soules, Cresco, Iowa.

1st, I claim the combination with the vibrating shovel-carrying beams, D D, and the devices, G G1 f and G2, of a screen and revolving separator, the latter receiving its motion from the driving and transporting wheels, substantially as described.

2d, The construction of the screen, F F1, in combination with curved separating arms, e e, applied to a revolving shaft, C, said screen and shaft being supported upon a vibrating shovel-carrying frame, substantially as described.

3d, Adapting the grooved drum, C, carrying arms, e, to serve as a support for, and a means of keeping in place the rods composing the screen, substantially as described.

4th, Arranging the drum, C, with its curved arms, e, in such manner that these arms serve as elevators for transferring the potatoes from the front to the rear portions of the screen, F, and at the same time serve as separators for freeing the potatoes from earth, substantially as described.

69,137.—SHOVEL PLOW.—M. E. Stanger, Wheeling, Ill.

I claim a shovel plow having wings, C C, jointed to it and arranged by means of a series of holes, 1 2 3 4, etc., for turning a wide or narrow furrow, substantially as set forth.

69,138.—FARM GATE.—G. W. States and A. W. Lutts, Norwalk, Ohio.

We claim the means of applying a lever in combination with self-adjusting dog, to raise farm gates with greater ease, and the device of the notch, F, and the hinges, C, whereby we secure greater strength and durability.

69,139.—ROCK DRILL.—John S. Stockham, Red Dog, Cal.

I claim the drill constructed with the drill rod, E, the tappet, F, spring, G, and cam, I, operating within the swinging frame, D, supported by standard, B, for giving universal motion, substantially as described.

69,140.—CORSET.—Wesley H. Stroup, Pittsburgh, Pa.

I claim a corset fastening, the female part of which is provided with a movable guard, k, actuated by cords, C, the whole constructed and operating substantially as described, in combination with a corset provided with a detachable fastening, as hereinbefore described.

2d, I claim the button attachment, B, arranged to operate substantially as set forth.

69,141.—WASHING MACHINE.—H. Thompson, Wyocena, Wis.

I claim the combination of lever, C, cross bar, G, blocks, H H, and toothed lining, L, arranged, constructed, and operating in the manner substantially as shown and described and for the purpose set forth.

69,142.—PIPE COUPLING.—Nathan Thompson, St. John's Wood, Eng. Patented in Eng. March 15, 1867.

1st, I claim the general combination and arrangement of parts for connecting together the ends of pipes or tubes, substantially as herein shown and described.

2d, I claim the application of cams, eccentrics, or locking pieces, e e, or equivalents therefor, substantially as and for the purpose herein shown, and described, and

3d, I claim the mode, herein shown and described, of operating upon such cams, eccentrics, or locking pieces, e e, by means of levers, f, substantially as and for the purpose herein shown and described.

69,143.—MODE OF CLOSING THE MOUTHS OF BOTTLES.—Nathan Thompson, St. John's Wood, Eng. Patented in Eng. March 28, 1867.

I claim, 1st, the combination and arrangement of means or apparatus for closing the mouths of bottles, jars, and other vessels, substantially in the manner herein shown and described, and

2d, I claim the employment of cams, eccentrics, or pressing pieces, d, acting to press the stopper, c, firmly to the neck of the bottle, jar, or other vessel, so as to close the mouth thereof, substantially in the manner herein shown.

69,144.—FRUIT PICKER.—Ibrook Tower, Milford, Mich.

1st, I claim the cushioned arm, N, or its equivalent for the purpose designed.

2d, The combination and arrangement of the cushioned arm, N, with the other parts of a fruit picker, arranged substantially as described for the purpose designed.

69,145.—FOLDING CHAIR.—E. W. Vaill, Worcester, Mass.

1st, I claim the curved hinge, H H1, in combination with the legs, B B1, arms, E E1, and the standards, S S, of a folding chair, substantially as and for the purpose described.

2d, The chair above described, consisting of the curved legs, A A1 B B1, rounds, R R R1, curved and slotted arms, E E1, curved hinges, H H1, cross bars, C C1, traverses, T1 T1, and standards, S S, all constructed, combined, arranged, and operated substantially in the manner and for the purposes specified.

69,146.—HORSESHOE.—Albert S. Wilkinson, Pawtucket, R. I.

1st, I claim the combination of the metallic plate, a, either jointed or otherwise, with a casing, B, of elastic material, extending continuously around it, substantially as and for the purpose set forth.

2d, I claim the secondary plate, A, in combination with the plate, a, and casing, B, substantially as specified.

3d, I claim the combination of the metallic toe piece, e, with the plate, a or A, and rubber sole, B, substantially as and for the purposes set forth.

69,147.—AXLE FOR VEHICLES.—J. B. Wilson (assignor to Eleanor Wilson and Allen T. Wilson), May's Landing, N. J.

1st, I claim an axle consisting of a central wooden shaft, A, and metal ends, B B, having hollow arms, c, constructed for the reception of the ends of the said shaft, substantially as described.

2d, The metal end, B, consisting of a hollow journal, a, collar, b, and an arm, c, when the said parts are constructed and arranged in respect to each other, substantially as and for the purpose set forth.

69,148.—LADIES' WORK TABLE.—John Wood, Lowell, Mass.

I claim a work table with tray, c, and box, d, arranged substantially as described and for the purpose fully set forth.

69,149.—JACK SPINNING MACHINE.—A. B. Woodbury, Ashuelot, N. H.

I claim, in combination with the jack carriage and the faller, or wire, mechanism, substantially as described, for intermittently raising the faller or wire in order to regulate the laying of the yarns upon the bobbins, while the carriage is being run in from time to time.

I also claim the combination, substantially as described, applied to the jack carriage, faller, or wire and frame, for regulating the laying of the yarn upon the bobbins, such consisting of the lifter, c1, the spur gear and ratchet, the lever and its pawl or pawls, and the tripper, the whole being applied together and to the carriage and frame, and with respect to the faller or wire, as hereinbefore explained.

69,150.—NUTMEG GRATER.—C. Worden, Binghamton, N. Y.

I claim the construction and arrangement of the frame, A, grater, B, slotted plate, G, slide holder H, spring and follower, J, substantially as described and represented for the purpose set forth.

69,151.—JUG TOP.—Homer Wright, Pittsburgh, Pa.

I claim, 1st, Combining the hinge and knob of a jug top in one piece, as substantially specified.

2d, The opening, H, in the lid, when used in combination with the hinge and knob piece, as set forth.

3d, The convex bulge, P, on the lid, when used in combination with the hinge and knob piece, and opening, H, in the lid, as substantially set forth.

69,152.—CARPET CLEANER.—Geo. W. Young (assignor to G. W. Smith), San Francisco, Cal.

I claim the whips in combination with the beaters, as shown and set forth.

I also claim the combination of the combination of the combined whip beaters with the brushes, D D, according to arrangements above described, and for the purposes above specified.

69,153.—STEAM ENGINE.—Robert Allison, Port Carbon, Pa.

1st, I claim the supplementary cylinder, B, with its piston, F, and valve, o, the rod, N, the bar, G, and the rods, J and K, arranged and operating substantially as shown and described for the purpose set forth.

2d, In combination with the supplementary cylinder, I claim the sliding block, a, and the stop plate, c, substantially as and for the purposes set forth.

69,154.—CAN.—Andrew D. Armstrong, Pittsburgh, Pa.

I claim the can, A, provided with the internal rim, B, in manner and for the purpose substantially as set forth and described.

69,155.—HYDRANT.—John W. Baker, Parkersburg, W. Va.

1st, I claim the arrangement, as described, of the shut-off cock and waste way immediately at the main, for the purpose set forth.

2d, The combination, substantially as described, of the shut-off cock and waste-way, at the main, with the hand lever and connecting rod, for the purpose set forth.

3d, The combination, with the inclined supply pipe, of the shut-off cock and waste ways, I I, immediately at the main, for the purpose set forth.

69,156.—FIRE PLUG.—John W. Baker, Parkersburg, W. Va.

I claim the combination, substantially as described, of a shut-off valve or stop cock and waste-way, immediately at the main, with a train of gearing operated from the ping.

69,157.—CUTLERY.—Jonathan Baldwin, Northampton, Mass.

1st, I claim the method of attaching the scales of a knife handle to the tang, by means of dovetailed grooves cut into the former, into which metal is run through the tang, substantially as herein described.

2d, The method, herein described, of attaching the shoulders, F F, to the tang, by means of the dovetailed grooves, a a, and metal cast L, substantially as shown.

69,158.—SPIKE.—James Balmer (assignor to the himself and Wm. Greenleaf), Brooklyn, N. Y.

I claim a spike, split or divided longitudinally, and having its split parts so beveled or inclined that, when driven into the wood, the portions on opposite sides of the split or cleft will diverge in opposite directions, parallel with the split or cleft, substantially as herein described.

69,159.—MACHINE FOR FINISHING THREAD.—Samuel Barbour, Lisburn, Ireland. Patented in England, May 14, 1866.

1st, I claim the bottom hooks, b, revolving upon their axles each adjoining pair connected by toothed wheels, b3 to equalize the tensional strain on the hanks as herein shown and described.

2d, The combination of the hooks, b, ratchet wheel, c1, catch, c2, spindle, c4, weighted lever, c5, and weighted cord, c6, all operating as described to equalize the finish on the thread as herein set forth.

3d, The weights, f1, levers f, pulleys, f2, and ropes or chains, g g1, in combination with the bar, h, and its hooks, b, for regulating the tension on all the hanks simultaneously as herein shown and described.

69,160.—AXLE BOX.—Silas Barker, Hartford, Conn.

I claim the combination of the bushing, d, with the axle box, C, when constructed so as to be replaced substantially in the manner herein set forth.

69,161.—CANE STRIPPER.—J. H. Barley, Sedalia, Mo.

I claim the implement, A, consisting of blade, B, and jaws, C and F, constructed together substantially as and for the purpose specified.

69,162.—CULTIVATOR.—J. H. Barley, Sedalia, Mo.

1st, I claim the combination and arrangement of the loop or bent hook, J, bent lever, I, connecting rod or chain, K, and lever pawl, L, with each other and with the frames, D and E, of the cultivator substantially as herein shown and described and for the purpose set forth.

2d, The combination of the rack, M, with the standard of the frame, E, and with the lever pawl, L, to operate in connection with the loop or bent hook, J, and bent lever, I, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the pivoted seat bars, N, and adjustable holders, O, with the side bars of the cultivator frame, C, substantially as herein shown and described and for the purpose set forth.

4th, The shield, F, constructed with flanges, f1, and wings, f2, and connected to the frames, E and D, by the bar G, and chains, H, substantially as herein shown and described and for the purpose set forth.

69,163.—RUBBER BOOT HEELS.—J.F.Barrett, Concord, Mass.

I claim the employment of a clinching plate, of metal or other material, for the purpose of turning the points of nails used in securing elastic parts to the surfaces to which they are to be attached, substantially as set forth.

69,164.—SHEEP SHED AND RACK.—Geo.Beatty, Carrollton, Ohio.

I claim the vibrating feed trough, E, and rack, D a b b1 c, arranged and operating substantially as described, in combination with a sheep shed as set forth.

69,165.—COMPOSITION FOR FILLING THE PORES OF WOOD.—J. F. Bernard, Leominster, Mass.

I claim the within described composition made of the ingredients set forth, and mixed together substantially in the manner and for the purpose specified.

69,166.—CITY CAR AND OMNIBUS FARE BOX.—J. Blackadder. New Orleans, La.

I claim the reflectors, C, combined with a money receiving box of a car or carriage, arranged substantially as and for the purposes set forth or so that the deposited ticket or money or a representation thereof can be seen by both driver and passenger.

2d, In combination with the above I claim the glass windows, B, glass guides, D and D1, and the wheel, C1, arranged as described for the purpose specified.

69,167.—HAND SPINNING MACHINE.—John Blackwood, and T. C. Wilson, Cincinnati, Ohio.

1st, We claim the loose pulleys, s s' on the shaft, h, in combination with the slotted lever, p, the long lever, P, the pulleys, u u, bands, w w, and the carriage, B, arranged and operating substantially as and for the purposes described.

2d, The combination of the feed rolls, b b', the pinion, c, the rack, d, the slotted lever, p, the pulleys, s s', and the carriage, B, arranged and operating substantially as set forth.

69,168.—PAINTERS SCAFFOLD.—Johan Blomgren, and Carle Andersen, Galesburg, Ill.

We claim the extension scaffold above described, composed of frames, 1 2 3, etc., containing the floors, I I 1", and the ladders, e e' e", elevated or lowered by the rollers, D and M, and the cords, K, K', and stopped by the pawls, p p1 p2, all constructed and operated substantially as and for the purpose specified.

69,169.—WATER WHEEL.—L. W. and R. A. Blood. Springfield, N. H.

We claim the star pointed bucket, E, formed by the intersections of the sides, f g, as shown and described in combination with the air or vent holes, i, the whole constructed substantially as set forth.

We also claim in combination with the above the pieces, h, substantially as and for the purpose set forth.

69,170.—HAND SEEDERS.—Thomas Bradley, Preble, N. Y.

I claim the arrangement with the hoe of the roller, C, with the cavities, c c, operated by the cord, g, in conjunction with the elastic spring, D, to receive the seeds from the box, B, through the holes, a a, in the plank piece, A, and discharge them through the holes, b b, substantially as described.

69,171.—DRYER FOR SCOURED CLOTHES.—Jos. Braun, Bridgewater, Pa.

I claim the use of a hollow metallic core the form of which corresponds to the form of the human body and its wearing apparel, said metallic core being used with steam substantially as herein described and for the purpose set forth.

69,172.—HAT BLOCK.—J. B. Brown, Middletown, N. Y. (assignor to himself and Joshua Draper).

I claim as an article of manufacture an emery or sand covered cone for the purpose described substantially as specified.

69,173.—NUT FASTENER.—Chas. Buckley Jr., Rochester N. Y.

I claim the combination of the concentric shoulder, c c', of the fixed washer, C, with the key, d, nut, B, and bolt, A, arranged and operating substantially as and for the purposes set forth.

69,174.—GRINDING MILL.—J. Burns, New York City.

I claim the construction of the crusher, d, the same being provided with spiral tapering shoulders, d', which are made and operating substantially as herein shown and described.

69,175.—LAND ROLLER.—G. R. Burt, Perry, N. Y.

1st, I claim the rollers, C, when provided with the flanges or bands, D, upon the inner ones of which the brakes, J, bear as herein set forth for the purpose specified.

2d, The castor roller, E, in combination with the roller, C, flanges or pins, D, and brakes, J, as herein shown and described.

3d, The combination of the spring brake, H I J, with the seat frame, F, and cylinders, C, substantially as herein shown and described and for the purpose set forth.

4th, The rollers, C C, when suspended from the same shaft, B, beneath the frame, A, constructed as herein described.

69,176.—WINDOW SHADE FIXTURE.—Wm. Campbell, New York City.

I claim the combination of the loose or sliding pins or bolts, F, having beads formed upon them with the flattened or notched shaft, D, substantially as herein shown and described, and for the purpose set forth.

69,177.—BOTTLE.—H. S. Carley, Cambridgeport, Mass.

I claim a bottle provided with a shoulder, C, on the inside of its neck, near to its mouth, substantially as and for the purpose herein shown and described.

69,178.—MACHINE FOR MAKING CLOUDED YARN.—Joseph Chase, Worcester, Mass.

1st, I claim the combination in a machine as described with the yarn feed rolls of the roving feed rolls or their equivalents in such manner that while the yarn or main thread is fed forward with a continuous motion the feed of the roving to the said thread shall be intermittent as and for the purpose specified.

2d, The combination of the yarn feed rolls with the rolls for producing the intermittent feed of the roving arranged and mounted in the machine relatively to the said yarn feed rolls as and for the purposes herein described.

3d, The combination with the feed rolls, G G' and F F', of the yarn guide, H, whereby the yarn as fed down upon the back of the roll, G, while the end of the roving is left in close proximity to the latter as shown and described.

4th, The combination with a machine for winding and twisting threads of yarn of an intermittent roving feeding mechanism, for clouding the yarn substantially as set forth.

69,179.—MODE OF TEACHING MUSIC.—J. C. Clime, Philadelphia, Pa.

1st, I claim a diagram consisting of the representation of a key board, and a series of lines so arranged as to form spaces opposite to the keys represented in the key board, the said space containing signs or marks indicating the keys to be struck together, all substantially as and for the purpose described.

2d, A diagram representing a key board in which a mark or sign is placed on each black key to be struck as set forth.

69,180.—COAT.—Philip Cohen, St. Joseph, Mo.

I claim a coat, the skirt portion of which is made adjustable in size, substantially as and for the purpose specified.

69,181.—BUCKLE.—Ezra Cole, Fairfield, Mich.

I claim the buckle constructed as described, consisting of the curved frame, A, having at one end the plate, C, provided with a downward projection or lug, D, in combination with the bail, E, whose pins, F, rest and slide upon the upper edges of the curved frame, A, as herein described, as and for the purpose specified.

69,182.—BUCKLE.—Ezra Cole, Fairfield, Mich.

I claim a buckle, consisting of the plate, B, and frame, F, having swivelled tongue plate, E, when all constructed substantially as and for the purpose described.

69,183.—PUMP.—Gilbert M. Cole, Folsom city, Cal.

I claim the combination of the valves, a b c d, valve seats, I, pistons, C D, bar, H, chamber, E, and cylinder, A, substantially as described, for the purpose specified.

69,184.—CHUCK.—William T. Cole (assignor to himself and Jacob F. Hunter, and Peter P. Keller), New York city.

I claim the combination of the pawls, B, oscillating plate, C, and revolving box, A, all constructed and operating substantially as herein shown and described.

69,185.—METALLIC PAINT.—Henry E. Colton (assignor to himself and C. T. Reynolds & Co.), New York city.

I claim the use of the oxide of zinc, and the oxide of lead, etc., combined with mineral and animal oils, in a paint or pigment for covering the bottoms of iron vessels and other iron surfaces, substantially as described.

69,186.—CULTIVATOR.—E. W. Connely, Charleston, Ill.

1st, I claim the slotted adjustable crank spindles, B, in combination with the axle, A, and wheels, C, substantially as herein shown and described, and for the purpose set forth.

2d, Pivoting the forward ends of the beams, K, to the longitudinal bars, B, by means of bent or elbow bolts, S, substantially as herein shown and described.

3d, Pivoting the forward ends of the beams, K, to the tongue, G, by means of the bent or elbow bolts, U, substantially as herein shown and described.

4th, Pivoting the forward ends of the beams, K, to the front cross bar, E, by means of elbow or bent swinging bolts, T, substantially as herein shown and described.

5th, Pivoting forward ends of the beams, K, to the front cross bar E, by means of the strap or band, X, passing around the said cross bar, E, and secured to the ends of the said beams, K, substantially as herein shown and described.

69,187.—HAY RAKER AND LOADER.—L. D. Copeland, Chenango Forks, N. Y.

1st, I claim the movable and adjustable bearing of the driving wheel shaft for adapting the machine to the different kinds of work, and for allowing the machine to be moved when not at work as recited.

2d, The toothed wheel, y, and pinion, z, with the pawl, x1, for operating and controlling the pitcher, or the equivalents of those means for that purpose.

69,188.—SELF-ACTING MULE.—H. Crossman (assignor to himself and Albert Briggs), Providence, R. I.

1st, I claim connecting the faller locking mechanism with the relief lever in a self-acting mule, by an intermediate lever connection, operating substantially as described, for the purposes specified.

2d, Imparting a slow movement to the delivery rollers, in a self acting mule during the time that the carriage is running in, by the means substantially as described.

3d, The combination and arrangement of the catch wheel, I, holding dog, l, and lever, L, with the mule carriage, substantially as described, for the purpose specified.

4th, Combining the main cam shaft in a self-acting mule, with a chain gear, as arranged and shown, to give motion to the same, substantially as described.

5th, The combination of the escapement plate, P, whose periphery is formed with ratchet teeth as shown, with a spring brake and stop, Q, substantially as described.

6th, Combining a mule carriage with its source of motion, by means of the peculiar friction clutch, E, substantially as described.

69,189.—CURTAIN FIXTURE.—Jacob David, New York city.

1st, I claim the arm or detent, K, arranged upon the roller in such a manner that it moves toward and away from the center or axis of the roller, a, by the action of gravity and centrifugal force, substantially as described.

2d, The combination and arrangement at the same end of a shade roller of the spring, e, rod, d, and arm or detent, k, or their mechanical equivalents, substantially as described.

69,190.—THILL COUPLING.—Lyman Derby, New York city.

I claim the curved thill iron, E, in combination with the roller, C, covered with india rubber or other suitable material, and fitted between lugs or ears, a a, at the front side of the clip, B, and the bottom plate, a, of the lugs or ears curved at its upper surface, substantially as shown and described.

69,191.—FENCE.—Benjamin K. Dorwart, Lancaster, Pa.

We claim the brace board, A, with its notches, a a, cut out in the manner shown, with its attached central cross piece, C, slotted, in combination with the wedge or key, W, arranged in all its parts, and applied in the manner and for the purpose specified.

69,192.—APPARATUS FOR FILTERING PETROLEUM.—Richard B. Douglas, Cleveland, Ohio. Antedated Sept. 12, 1867.

I claim the drum filter, E, in combination with the cylinder, A, the inlet and eduction cocks, C K, and dirt discharge, F, substantially as described.

69,193.—BED BOTTOM.—Julius Dreusike, Cincinnati, Ohio.

I claim the bed bottom having the interlocked spiral wires, B, secured to the grooved head and foot rails by the devices, C D d E, substantially as and for the purpose set forth.

69,194.—TURNING PLATE FOR CARRIAGE.—T. A. Edmison, Lakeport, Mich.

I claim the plate, C, with its rollers, in combination with the turning plate or ring of a vehicle, substantially as and for the purpose described.

69,195.—SHEEP SHEARING TABLE.—Webster Ellyson, West Branch, Iowa.

1st, I claim an improved device for holding sheep while being shorn, formed by the combination of the platform, A, having hinged ends, hinged adjustable side boards, C, adjustable supporting racks, E, straps, D and E, lever pawls, G, catches, H, and brace blocks, J, with each other, substantially as herein shown and described.

69,196.—MANUFACTURE OF HAY AND OTHER FORKS.—George B. Ely, St. Johnsbury, Vt.

1st, I claim the combination of the dies, E, wheels, D, shafts, B, plates, F, all constructed and arranged substantially as described, and for the purpose specified.

2d, The dies, E, shaft, B, having plate, F, and set screws, G, wheels, D, with the groove and tongue gear wheels, C, and standards, A, all constructed and arranged as described, whereby hay and manure fork tines are drawn and bent, substantially as described, for the purpose specified.

69,197.—CARRIAGE SPRING.—W. H. English, Macon, Ga.

I claim an elliptic or semi-elliptic spring for vehicles, constructed of curved elastic steel plates with a narrow or thin rib of steel, applied to their exterior surfaces, substantially as shown and described.

69,198.—SPRING BED BOTTOM.—Elisha E. Everitt, Phil. Pa.

1st, I claim the transverse bars, D, having one or more grooves, in combination with the pin, E, arranged to receive the coils of the spring, and to fit the said groove, all substantially as set forth.

2d, The within-described spring, having ends, fitting into the transverse bars, D, and being bent and arranged for the reception of the slats and pins, 11, substantially as set forth.

3d, The slats connected at one end to the within-described springs, on the transverse bar, D, and resting at the opposite end on the transverse bar, D', to which it is confined by a pin, y, all as set forth.

69,199.—HORSE BLINDER.—Smith Ferris, New York city.

I claim, as a new article of manufacture, a fire blinder for horses and cattle, constructed as described, consisting of the cap, A, to be placed over the eyes and the space between the eyes, having the elastic strips, a a, connected by loops, b b, the metal bars, B C, hooks, d d, and strips, e, substantially as described, for the purpose specified.

69,200.—COOLER AND FILTERER.—H. W. Fisher, Phila. Pa.

I claim the case, A, formed with three compartments, a b c, and a filtering medium, e, in combination with the ice chamber, F, and pipe, C, E, all arranged substantially in the manner as and for the purpose set forth.

69,201.—MODE OF ATTACHING CALKS TO HORSESHOES.—James Forbes, Plainville, Mich.

I claim attaching the calks to horseshoes, by means of the hook or beak, e, and screw, f, in the manner and for the purpose set forth.

69,202.—SAWING MACHINE.—H. C. Freeman, Lewisville, Ind.

1st, I claim the semi circular saws, H, attached to the shaft, K, in such manner that while one is fixed in position, the other may be adjusted according to the length into which the wood is to be cut, arranged to operate substantially as set forth.

2d, So arranging the shaft, K, and frame, I, that the semi-circular saws, I I, may be attached either to the two frame pieces, L, one fixed and the other adjustable, or one of the saws only be attached to the intermediate piece, L', and the frame be actuated directly by hand, substantially as and for the purpose set forth.

3d, So arranging the beam, Q, as to act upon the oscillating frame, L, when raised by the rods, N, substantially as set forth.

69,203.—ATTACHMENT FOR COOK STOVE.—Jeannette Garrison, New York city.

I claim a screen applied to a cook stove at the top of the fire chamber between it and the top flue, substantially as and for the purpose herein set forth.

69,204.—MARKET BOX.—F. Gearing (assignor to himself and Henry Millingar), Pittsburgh, Pa.

I claim a market box, having its sides connected or secured together by means of the eyes, d e, rods, D, and battens, b, substantially as and for the purpose specified.

69,205.—CONDENSING TUBE FOR CARDING MACHINES.—William Germain, Rockbottom, Mass.

I claim a condensing tube, in wool carding machine, formed with a conoidal or cup-shaped head, e, substantially in the manner and for the purpose specified.

69,206.—FULMINATING COMPOUND.—J. Goldmark, B'lyn, N.Y.

I claim a fulminating compound, in which the sulphocyanite of a metal or other base is employed, in combination with chlorate of potash, either with or without other substances, substantially as herein specified.

69,207.—SEED DROPPER.—C. A. Harper, and John A. Partridge, Rahway, N. J.

1st, I claim the case, A, when constructed with an internal cylinder, B, and a curved spout, C, acting in combination with the oscillating wheel, D, to deposit the grain in the hill, substantially as set forth.

2d, The oscillating wheel, D, when constructed with a plurality of chambers, D1 D2, and so arranged that either chamber may be used, substantially as set forth.

3d, In combination with the wheel, D, having a plurality of chambers, the adjustable spring, H, eyes, F and F', and rods, I and I', substantially as set forth.

69,208.—WAGON SPRING.—C. P. Hawley, Mosherville, N.Y.

1st, I claim the arrangement and combination of the frames, E E, with the lugs, b, pins, a, staples, c, links, d, or their respective equivalents, with the springs, A, all made and operating substantially as herein shown and described.

2d, The slotted hinged frames, E, when so arranged that the bearings will be brought nearer to the axles the heavier the load, as set forth.

69,209.—STUMP EXTRACTOR.—Isaac D. Hazen, and Jonathan Hitchcock, Grand, Rapids, Mich.

1st, I claim the arrangement of shaft, E, and collar, J', with its pulleys and box, with the rim wheel, I, and its rollers, ball, H, box, G, and cord, d, as and for the purpose set forth.

2d, The arrangement of the frame, K, with its pulleys and block and tackle, with the main frame, for canting or removing the stump after it has been pulled, substantially as set forth.

69,210.—BURNING FLUID.—J. G. Hester, Raleigh, N. C.

I claim the improved burning fluid prepared of the materials substantially as herein described.

69,211.—SPINNING MACHINE.—George Hoover and Artemus N. Hadley, Richmond, Ind.

1st, We claim the adjustable inclined bearing arms, G G', for use with roving spools of diverse lengths and diameters, in the described combination with the roving delivery cylinder, E, and gravitating doffer roller, I.

2d, In the described combination, the roving delivery cylinder, E, the automatically opening and closing clove sash, and the roving delivery belts or cords, F, having permanent connection with said cylinder and intermittent connection with said sash, substantially as and for the purposes set forth.

3d, The roving cord clasp, S, combined in one sash with the clove, and being closed and opened by the opposite actions of the latter, whereby an amount of roving is automatically delivered, exactly corresponding to that required for the ensuing stretch, whether the same be more or less.

4th, The loop or cord clasp, S, whose stem, s, is drawn through the friction pad, R, and operated by the movable jaw, M, of the clove, in manner substantially as set forth.

5th, The arrangement of vertically guided and balanced clove sash whose movable and self-closing jaw, M, has a tongue, W, which impinging against a tappet, X, is made to engage behind a notch, o, or devices substantially equivalent in the described combination with an adjustable releasing pin

X', for the automatic opening and closure of the clove for any desired length or stretch of roving, as set forth.

6th. The provision on a vertically balanced and reciprocating clove sash, of the rearwardly and upwardly curved finger, T, for retraction of the faller wire, in the manner explained.

7th, In the described combination, the vibrating faller wire, 6, adjustable retracting spring, 8, spur, 11, spring dent, 13, and releasing mechanism, 14, 15, 16, whereby said faller wire is automatically operated by the ascent and descent of the of the above sash, in the manner explained.

8th, The spiral spring, S, and arm, T', applied so as to impart a downward movement to the faller wire and adapted to exert the greatest leverage when the faller wire is in its depressed position, as described.

9th, The arrangement of the adjustable driving pulley, 1, band, W, spindles, Y, whorls, y, and intermediate pressure pulleys or rollers, 5, as and for the purpose herein described.

10th, The provision in the plane of the spindles of the driving pulley, 4, armed with rundles, 32, and journaled at rear in the swiveled bearing, 30, and at front in the open bearing, 30, for convenient winding off and removal of the hanks, in the manner explained.

69,212.—HITCHING RING.—James P. Howell, N. Y. City.

1st, I claim a ring so constructed and combined with a suitable screw shank that when such shank is placed at one portion of the ring it will be rigidly fixed thereon, and when placed at other portions thereof will permit the said ring to hang loosely, substantially as herein set forth, for the purpose specified.

2d. The construction of the ring, A, with an enlarged portion, a, wedge shaped in its cross section and operating in connection with the eye, b, of corresponding shape, formed in the head of the screw shank, substantially as herein set forth, for the purpose specified.

69,213.—CHURN.—Henry W. Howland, Calhoun, Ill.

1st, I claim the holes, h, flaring caps, h1, valves or slides, h2, and discharge pipe, h4, in combination with a rotating churn, substantially as and for the purpose set forth.

2d, The dasher, L, constructed with oblique perforations, l, and double oblique serrated periphery, l1, in combination with the revolving vessel, H, substantially as and for the purpose specified.

3d, The arrangement of the upright shafts, B F I, crank wheel, C, pulleys, D F1 J, belts or bands, E K, and vessel, H, substantially as described.

4th, The dovetailed slide, h5, in combination with the dovetailed slitted lid, H1, and vessel, H, substantially as and for the purpose set forth.

69,214.—PORTABLE FENCE.—Joseph C. Hughes, Robinson, Ill.

I claim the combination of the straight panels, B, and triangular supporting frame, A, when respectively constructed substantially as set forth, with the combination of the corner panels, D, and supporting frame, C, when respectively constructed substantially as set forth.

69,215.—STEAM GENERATOR.—Geo. G. Hunt, Bridgeport, Ct.

1st, I claim the reverberating chamber, R, and ascending flues, T, within the water space of a steam boiler, when said chamber and pipes communicate directly with the fire chamber, A, and are so arranged as to cause the gases which accumulate above the coal in said chamber, R, to descend and pass through or over the incandescent coal below pipes, T, substantially as described.

2d. I claim the arrangement of the reverberating chamber, R, and ascending flues, T, directly over a grate surface, G, which extends beneath the said chamber and flues, and allows of a direct upward draft through it at points below the lower ends of the flues, substantially as described.

3d, I claim the pan reverberating chamber, R, arranged within the water space, in combination with a fire chamber, A, and the flues, T, arranged so as to effect the combustion of the gases, which are caused to escape from chamber, R, at points below the level of the coal in this latter chamber, substantially as described.

69,216.—VEST.—S. W. Huntingdon, Augusta, Me.

I claim a vest provided on one or both sides with an elastic goring or strip which partially encircles or surrounds the arm holes of said vest, substantially as and for the purpose set forth.

69,217.—BRICK DRYER.—James J. Johnston, Allegheny City, Pa., assignor to the People's Brick Machine Co., Pittsburgh, Pa.

I claim, 1st, The conformed dry house, in combination with the car, (when viewed in cross section) provided with flues connected with the boiler furnace and its stack, substantially as herein described and set forth.

2d, The car or truck for bearing off the brick, when constructed as herein described and represented and used for the purpose set forth.

3d, The combination of the pipes, h l m and n, with boiler furnace and the flues, f g, constructed, arranged, and operating substantially as herein described and for the purpose set forth.

4th, The use of a fan in combination with the pipes, h l m and n, for forcing heated air into and through the dry house, in the manner and for the purpose set forth.

69,218.—BOILER WATER REGULATOR.—R. J. Jordan (assignor to himself and E. Darling), Elkhart, Ind.

I claim, 1st, The arrangement of the reservoir, B, float, C, rod, a, valve, g, levers, d h, with reference to the steam generator, substantially as shown and described.

2d, The combination of the reservoir, B, with the turret, K, and wire coil, substantially as described.

69,219.—MACHINE FOR REDUCING ROLLER LEATHER TO A UNIFORM THICKNESS.—Wm. C. Joslin, West Thompson, Conn.

1st, I claim the combination in a machine for reducing calf skins, sheep skins, and lamb skins to a uniform thickness, the reducing cylinder, D, receiving and delivering rolls, B B C C, and adjustable bed, F, substantially as and for the purpose set forth.

2d, A machine for stretching and reducing leather to a uniform thickness, the parts of which are constructed and arranged for joint operation as and for the purpose herein set forth.

69,220.—BOAT LOWERING OR DETACHING APPARATUS.—Maurice Joyce, Washington, D. C.

I claim, 1st, The combination of frames, b b, spools or windlasses, d, shaft, e, frame, G, Wheels, H and I, or their equivalents, and worm, i, arranged, constructed, and operating in the manner substantially as shown and described and for the purpose set forth.

2d, The combination of brake, n, wheels, I and H, shaft, e, worm, i, and cam lever, l, arranged, constructed, and operating in the manner substantially as shown and described and for the purpose set forth.

3d, The combination of frames, b, having the ears, c c, with shaft, f, and bifurcated arms, D D, arranged, constructed, and operating in the manner substantially as shown and described and for the purpose set forth.

69,221.—SPRING FISHHOOK.—Daniel Kidder, Franklin, N. H.

I claim the fishhook constructed as described, consisting of the single piece of wire, B, bent at its center to form the eye, D, sliding upon the stem, G, its bent shanks, E, provided at each end with the hooks, C, crossing each other and held in position by means of the clasp, F, upon the end of the stem, G, all operating as herein set forth, the purpose specified.

69,222.—SKIRT ELEVATOR.—Blanchard V. Kirk (assignor to himself and H. A. Musselman), Philadelphia, Pa. Antedated Sept. 11, 1867.

I claim the combination of the india rubber tube, A, covered with a woven fabric, m, provided with tubular clasps, C C' having openings, h b, through which pass the cords, K, the whole constructed and operating substantially as described.

69,223.—REFRIGERATOR CAR.—Le Grand Kniffen, Worcester, Mass.

I claim, 1st, A refrigerator car, constructed substantially in the manner described, for the purpose of transporting meats and other perishable articles.

2d, Lining an ordinary box car with fibrous or textile nonconducting material, for the purpose set forth.

3d, Converting an ordinary freight car into a refrigerator by lining it with successive sheets or layers of thick paper, substantially in the manner described.

4th, The combination, substantially in the manner described, with a box car of removable sections or linings of nonconducting material, whereby I can in a few moments convert an ordinary car into a refrigerator.

5th, Lining a box car with elastic nonconducting material which will yield to the working of the car or even allow it to be broken without rupturing the nonconducting envelope.

6th, The arrangement in a refrigerator car of both the articles to be kept cool and the ice, or refrigerating apparatus inside the non-conducting envelope, whereby I protect the refrigerating apparatus from the external heat without additional protection.

7th, The arrangement as described of the hinged door in the lining with the sliding door of the car, whereby direct access can be had to the refrigerating chamber.

8th, The arrangement as described of removable ice racks with the lining sections nearest the doors, or those in which the doors are placed, whereby the ice is placed in last, and is thus more convenient of access and space economized.

9th, in combination with a refrigerator car, a removable ice rack which can be taken out when not required and its room occupied by other things.

10th, The arrangement in a refrigerator car of a refrigerating apparatus to produce cold without using ice, when desired.

11th, The arrangement within a refrigerator car of quick lime or other absorbent of moisture, to maintain a dry as well as a cold atmosphere.

12th, The arrangement as described of the removable side props and top beams whereby the sections are held in place and the distance between the beams can be varied to suit carcasses of different sizes.

13th, The arrangement as described on the top or cross beams of the sliding swiveling hooks, whereby the spaces between the holes can be varied and the carcasses conveniently swung.

69,224.—ADJUSTABLE RAILING FOR VEHICLES.—Chas. Krebs, Springfield, Mass.

I claim an adjustable railing for the seats of vehicles which is attached by means of the notched pieces, a a and b b, on the rail, and the pieces, f f, having the latches, i i, upon the seat, the parts being arranged substantially as and for the purpose described.

69,225.—AXLE BOX.—B. P. Lamason, Milton, Pa.

I claim the car axle box lid, A, provided with the clamp, b, in combination with the car, d, applied to the car axle box.

69,226.—BRAKE BLOCK AND SHOE FOR RAILROAD CARS.—B. P. Lamason and S. W. Murray, Milton, Pa.

We claim, 1st, The brake shoe, E, provided with circular lug, A, with flanges, o o, in combination with the shoe, D, with its opening B, of construction corresponding to the lug, the shoe and block being arranged to turn and to be held in place by pin, f, as and for the purpose set forth.

2d, The lug, A', with its flanges, o' o', in combination with the block, D', and pin, K, all constructed and operating as described and for the purpose set forth.

69,227.—WAGON TONGUE SUPPORT.—O. Lapham, El Paso, Ill.

I claim the combination of the spring, E, with the rear end of the tongue, D, and with the hounds, C, substantially as herein shown and described and for the purpose set forth.

69,228.—VEGETABLE SLICER.—Herrmann Liebmann, Mascoutah, Ill.

I claim a vegetable slicer having fixed lateral knives, and vertical knives that may be removed, attached to a revolving horizontal disk, when constructed and arranged substantially as shown and specified.

69,229.—MACHINE FOR TAPERING LEATHER.—William Mannheim, New York City.

1st, I claim a machine in which leather straps can be shaved or bevelled or their ends tapered, which is arranged so as to be adapted to every width and thickness of leather, and which will operate substantially in the manner herein shown and described.

2d, The jointed and hinged knife or cutter, C, when arranged on the stationary frame so as to be adjusted in position by the screw, D, substantially as and for the purpose herein shown and described.

3d, The removable rod, I, when provided with the adjustable sliding block, J, in combination with the roller, G, and cutter, C, all made and operating substantially as herein shown and described.

4th, The sliding frame, L, when provided with a handle, p, in combination with the frame, r, set screws, s, frames, E and F, roller, G, and cutter, S, all made and operating substantially as herein shown and described.

5th, The hinged jointed cutter, C, in combination with the roller, G, all made and operating substantially as set forth.

69,230.—MACHINE FOR CAPPING SCREW HEADS.—E. J. Manville, Waterbury, and E. M. Judd, Wolcottville, Conn.

1st, We claim the combination of a series of progressively moving dies for holding the screw, dies for pressing a cap of sheet metal over the head, and mechanism for nicking the sheet metal cap to correspond with the previously cut nick in the screw head all constructed and operating substantially as set forth.

2d, The combination of mechanism substantially as specified for effecting the following successive operations, viz: first placing the nicked screw head in the proper position, second, holding the same, third, pressing a sheet metal cap in a position to correspond with the previously nicked head, fourth, nicking the sheet metal cap in a position to correspond with the previously nicked head.

69,231.—WINDOW BLIND.—C. K. Marshall, Vicksburg, Miss.

1st, I claim as a new article of manufacture, window blinds formed of slats of metal set in a metallic frame in manner and for the purposes substantially as described.

2d, The hollow metal frame, A, having the wooded blocks, C, to receive the screws, d, securing the hinges, D, in manner and for the purposes substantially as herein shown and described.

69,232.—VALVE FOR STEAM ENGINES.—Joseph McConnell, Iowa City, Iowa.

1st, I claim the combination and arrangement of the arm, n, secured to the end of the rock shaft, T, between the cylinders, R, and in the slots of which the wrist pin, x, work connecting the arm, n, to the valves, p, the position of said pins, x, in the slots being controlled by means of the governor whereby the throw of the valves, p, is regulated as herein shown and described.

2d, The valves, p, constructed as described, formed in a semi-circle with the pressure of steam applied upon one side, as and for the purpose specified.

3d, The arrangement of the cylinders, R, main valves and cut off, p, transverse shaft T, slotted arm, n, connecting arms, v, and cranks, a, as and for the purpose specified.

69,233.—CARRIAGE CIRCLE.—Joseph R. McGuire, Warren, O.

1st, I claim the dowel pin, D, and groove, F, when constructed and arranged in relation to each other in the manner and for the purpose substantially as described.

2d, Section, C, when constructed with clips, H, in combination with section B, constructed with clips, J O, in the manner as and for the purpose substantially as set forth.

3d, The reach, M, when constructed with stays, N, in combination with the cross rail, I, and king bolt, L, when constructed and arranged in the manner and for the purpose set forth.

69,234.—CLAMP STRAP FOR SCHOOL BOOKS.—J. W. McKee, Brooklyn, N. Y.

1st, I claim two longitudinally adjustable side pieces, A, in combination with the straps, B, substantially as and for the purpose herein set forth.

2d, The combination of the suspending cord, C, with the longitudinally adjustable side pieces, A, and straps, B, substantially as and for the purpose herein set forth.

3d, The stems, c, in combination with the slotted lips, d, of the side pieces, A, and the straps, B, substantially as and for the purpose herein set forth.

4th, The supplemental knobs, a*, in combination with the longitudinally adjustable side pieces, A, and the straps, B, substantially as and for the purpose herein set forth.

69,235.—DOOR HOLDER.—W. A. Messler, Eureka, Ill.

I claim the catch, B, constructed substantially as described, attached to a wall or other suitable place, in combination with the lock, A, on door, D, in manner and for the purposes as herein set forth and described.

69,236.—BURGLAR PROOF WINDOW AND DOOR GRATES.—G. N. Miller and H. Mund, Chicago, Ill.

We claim in combination with the window or door, the grate, A, plates, F F, lock, E, latch, D, the whole arranged substantially as and for the purpose set forth.

69,237.—FAGOT FOR BEAMS.—W. W. Miller, Safe Harbor, Pa.

I claim the pile constructed as described and shown consisting of the bars, a, having flanges, b, bars, d, having flanges, d', hooked bolts, e, and the flat bars, c, as and for the purpose specified.

69,238.—COFFIN.—I. D. Nietsche, Somerset, Ohio.

I claim the apparatus for filling the coffin with gas, consisting of the tube, G, having the perforations, k, in combination with the tube, L, having the perforation, l, and with the collars, h h', and the cap, O, substantially as and for the purpose specified.

69,239.—HARROW CULTIVATOR.—Henry W. Ostram, Grand Rapids, Mich.

I claim the combination of the frame, A, mounted on guide wheels, B B, the bars, a a, suspended on the cross rod, b, the movable cross bar, d, and the cross bar, m, attached to the handles, k k, arranged and operating as and for the purpose herein described.

69,240.—DISH AND VEGETABLE WASHER.—I. N. Paddack, Oswego, New York.

I claim the dish and vegetable washer consisting of the tub or cylinder, A, and elastic grating, E, fixed therein, journalled in appropriate bearings and operated in manner and for the purposes substantially as described.

2d, The hinged plate, D, in combination with the standard, B, tub or cylinder, A, in manner substantially as and for the purposes above set forth and described.

3d, The spur lever, F, engaging in and in combination with the hook, f, and a lid or door, A', in manner substantially as herein shown and described.

69,241.—JOINT OF RAILROAD RAILS.—George Palmer, Littlestown, Pa.

I claim the connecting bar, H, constructed as described with the bottom of the recesses, m m, parallel to the inclined faces of the connecting bar, in combination with the rails and diagonal bolts, v v. When the bolts are at right angles to such inclined faces as herein described for the purposes set forth. In combination with the above, I claim the chair, B, provided with a slotted base, as and for the purposes specified.

69,242.—COAL STOVE.—Calvin Pepper, Norfolk, Va., assignor to Sidney Smith.

I claim the use of the finely perforated diaphragm, D, placed at a distance above, and covering the fire substantially as shown and described for the purpose and effect set forth. As a new article of manufacture a cap or cover for a heating stove constructed with a diaphragm, D, to be applied to stones already constructed and in use.

69,243.—WHEEL FOR CHAIN HORSE POWER.—Stuart Perry, Newport N. Y.

I claim as new and desire to secure by letters patent, a chain wheel having sliding or yielding cogs or teeth, so that a chain made up of links of unequal lengths can be run thereon, and some of the links always find a tooth or cog that will receive and hold, and those not so receiving and holding are moved out of the way, as and for the purpose substantially as described.

69,244.—SUGAR CANE MILL.—D. J. Powers, Madison, Wis., and Henry B. Stevens, Buffalo, N. Y., assignors to Buffalo Agricultural Machine Works.

I claim, 1st, Locating the driving wheel, A, beneath the bridge tree, L, and between the housings or side frames, M M, substantially as and for the purpose herein specified.

2d, In combination with the location of the driving wheel under the bridge tree, as above, we also claim the location of the pinion, B, outside of the housing or side frame, M, for the purpose set forth.

3d, The arrangement of the wedges, T T, and saddle pieces, U U, for adjusting the springs, Q Q, and bearings or journal boxes, R R, of the lower or minor rollers, substantially as herein set forth.

4th, The scraper or turn plate, V, constructed and arranged so as to self-adjust itself to the position or positions of the lower feed roll, H, substantially as herein specified.

69,245.—COAL BARGE.—Julius A. Preston, New Haven, Ct.

I claim, 1st, The combination in a coal barge or other similar vessel with a freight receptacle or compartment having an inclined or sloping bottom, as described, of a well and suitable means for opening and closing the same, substantially as and for the purposes herein set forth.

2d, The combination in a compartment as described, of the well or opening with its surrounding frame, and valves or gates for regulating the flow of the coal or other freight into the said well, substantially as herein shown and specified.

3d, The combination with the freight compartment or receptacle and its inclined bottom, of one or more channels for drawing off the water said compartment, substantially as herein set forth.

4th, A barge for transporting coal and other freight, in which the compartment for receiving such freight is combined with the body or hull of the barge, substantially as herein shown and for the purposes set forth.

69,246.—WASHING MACHINE.—J. H. Quackenbush, East Saginaw, Mich.

I claim, 1st, The roller, E, having a longitudinal motion substantially as described, in combination with rollers or other moving portion of a washing machine, for the purposes set forth.

2d, The rollers, D D, operated substantially as described, in combination with the roller, E.

69,247.—TWEER.—J. B. Raines and W. S. Owen, Oskaloosa, Iowa.

We claim the combination and arrangement of the box provided with the tube as constructed with water space around it, chamber, A, bottom slide, H, and damper, D, when formed in the manner herein set forth and for the purposes specified.

69,248.—CHURN DASHER.—Franklin Ransom, Buffalo, N. Y.

I claim, 1st, Forming the dasher with a series of wings in the form of spouts or troughs with the sides converging outward, in the manner and for the purpose set forth, said wings being capable of standing in different angles, as described.

2d, The combination and arrangement with wings thus formed of the tubular rod with the outlets, f f, opening directly in the rear of wings, as herein set forth.

69,249.—MANUFACTURE OF SUGAR.—J. W. Reid, N. Y. City.

I claim, 1st, The process substantially as herein described of effecting the crystalization of sugar by subjecting it to the action of beaters or stirrers within a receiver having a stream or streams of cold water or air made to play on or around it and between it and an outer jacket, or its equivalent, substantially as and for the purposes or purposes specified.

2d, The combination with a sugar mixing apparatus consisting of a receiver, A, stirrers, B, and jacket, E, of the cold air or water pipe, F, arranged below and upper opposite discharge pipes, G, both connecting with the interior of the jacket, substantially as herein set forth.

69,250.—PUMP.—Andrew J. Reynolds, Sturgis, Mich.

I claim, 1st, The arrangement in a hollow piston of the valve, O, and guide pin, N, as and for the purpose set forth.

2d, The construction of the upper cylinder head with the induction port, c, and valve seat, G g g', as and for the purpose specified.

3d, The arrangement in a submerged pump of the ports, b e M, valves, F I O, and hollow piston and rod, L K, as herein described and represented.

69,251.—ATTACHING YOKES TO POLES FOR CARRIAGES.—Uel Reynolds, New York City.

I claim the eye, c, and notch, d, upon the socket, b, in combination with the yoke, f, and stop horns, h and i, substantially as and for the purposes set forth.

69,252.—MEDICAL COMPOUND.—A. Rullman, N. Y. City.

I claim the medical compound herein described, made of the ingredients and in the proportions herein specified.

69,253.—APPARATUS FOR BURNING CRUDE PETROLEUM.—Charles Saffray, M. D., New York City.

1st, I claim the use of hollow grate bars divided in three superposed compartments, the middle compartment containing petroleum and the two others receiving, by means of the arrangement of stop cocks above described, either steam alone or hot air alone, or a mixture of both, said grate bars being perforated as represented in the drawing, so as to allow either steam alone or hot air alone, or a mixture of both, to escape inside or outside of the flame.

2d, The use of the safety pipe above described.

69,254.—CANDLE HOLDER.—M. Schall, New York City.

I claim the combination with the socket, B, or its equivalent, of a sharp pointed needle or pin, substantially as and for the purpose described.

69,255.—CULTIVATOR.—John Schroder, Kickapoo, Ill.

1st, I claim the manner herein shown and described of securing the plow beams to the frame, A, by means of peadants, G, and a movable cross bar, F, the latter being pivoted to the tongue, D, substantially as set forth.

2d, The above in combination with the swinging draft bars, N, made as described.

69,256.—NUT MACHINE.—Adam Schwebel, New Haven, Ct.

1st, I claim the combination of the two series of cutting dies, c c, with the moving frames, D D, when arranged and made to operate as described.

2d, I claim the combination of the two cutting dies, the series of punches, and the semi-rotating shafts, arranged as described, with any suitable means for rotating said shafts, in the manner and for the purposes set forth.

3d, I claim the combination of the sliding frame, D, semi-rotating shaft, E, and series of punches, arranged and operating substantially as described.

4th, I claim the combination of the series of punches, d d, with the series of spindles, ff, and means substantially as herein described, for transferring the nuts from the punches to the spindles.

5th, I claim the combination of the crowning die plate, F, made as described, with recesses in its upper edges for the reception of the punches, for the sliding frame, E, and spindles, f f, substantially as set forth.

6th, I claim the combination of the rock shaft, V, and frame, y y, with the rest, a, and means for causing said frame, y y, to descend, and hold the bar from which the nuts are to be cut, substantially as described.

7th, I claim the combination of the oscillating and vertically sliding plates, B B', operated substantially as described, with the series of spindles, ff, as and for the purposes set forth.

8th, I claim the combination of the cam rock shaft, converting bar, u, loose cams, w w, pulleys, v v, and chains, V V, or cords, with the semi-rotating shafts, E E, for operating the same, alternately by right and left, in the manner herein described, for the purposes specified.

69,257.—HOISTING APPARATUS.—E. U. Scoville, Manlius, and W. L. Scoville, West Bloomfield, N. Y.

1st, We claim the frame, b, attached to the platform, a, so that it can be turned around, in combination with the legs, e e1, and beam, g, sustaining the hoisting apparatus, substantially as set forth.

2d, The hook, m, and rope or chain, h, in combination with the pulley, h1, and rope, n, as and for the purpose set forth.

3d, The latch, n1, applied to the rope, n, in combination with the notches, y, of the pulley, h1, and the disengaging levers, o, as and for the purposes set forth.

4th, The disengaging frame, o1, attached to the rope, h, in combination with the levers, o, and pulley, h1, for the purposes and as specified.

5th, The barrel, r, clutch and shaft, 10, in combination with the beam or lever, l, and inclines, t1, as and for the purposes set forth.

6th, The lever, w, upon the beam, l, in combination with the hak fulcrum, w1, and stationary ring, t2, to operate the brake to the barrel, r, as and for the purposes set forth.

69,258.—CORN HUSKER.—Joseph Sechrist, Connellsville, Pa.

I claim the combination of the gloves, A, and tubular claws, B, for husking corn, arranged to operate substantially as set forth.

69,259.—TUNING ATTACHMENT FOR GUITAR.—H. Seehausen, Memphis, Tenn.

I claim the ordinary turning mechanism of a guitar, banjo, or other similar string instrument, in an adjustable frame, B, fitted in the head of the instrument, and all arranged substantially in the manner as and for the purpose set forth.

69,260.—IMPREGNATING WOOD WITH OLEAGENOUS AND SALINE MATTERS.—Charles A. Seely, New York city.

1st, I claim the process of impregnating wood, substantially as described.

2d, I claim the use, in conjunction, of the hot and the cold baths, for the purpose describe i.

69,261.—WASHING MACHINE.—Henry F. Sehnders (assignor to himself and Barbora Wacherman), Buffalo, N. Y.

1st, I claim the combination of the reciprocating rubber, C, stationary board, B, springs, c, with the connecting rod, I, rock shaft and arm, J b, arranged and operated substantially in the manner and for the purpose set forth.

2d, I claim the receptacle, a, provided with stop cock, q, and flexible pipe, p, in combination with rubber, C, substantially as and for the purpose described.

3d, I claim the feed rollers, D E, in combination with the ratchet wheel, k, double acting pawl, m, arm, l, and pitman, n, operating in the manner and for the purpose set forth.

4th, I claim the cams, K K, connected by rod, f, in combination with the hook, l, spiral springs, c, and rubber, C, for elevating the latter, arranged and operating substantially as specified.

69,262.—CAR BRAKE.—Walter S. Shotwell, Paterson, N. J.

1st, I claim the combination and arrangement of the rods, E E, levers, F, spring rods, H, arms, d and g, rods, h, cranks, I, shaft, I, arm, j, and cords, J, substantially as described, for the purpose specified.

2d, The rods, H, in combination with the cords, J, connected with the bell rope, O, the shafts, I, shafts, c, having arms, d, attached, on which the rods, H, rest, all arranged substantially as shown and describ d.

3d, In combination with the brake herein described, I claim the bars, L, and lever, M, substantially as and for the purpose specified.

69,263.—CAR AND OMNIBUS FARE BOX.—John B. Lawson, New Orleans, La.

I claim the apartment, E, when provided with an opening for the passage of light toward the fare box, and with a reflector, I, on the opposite wall, the lamp, H, being arranged between, substantially as described.

2d, Providing the apartment, E, with openings, F and G, for allowing the passage of light toward the fare box, and toward the front or rear, substantially as and for the purpose herein shown and described.

69,264.—STRAW CUTTER.—D. A. Smith, Pomeroy, Ohio.

I claim the wheel, C, provided with the knives or cutters, D, in combination with the feed roller, J, fitted within sliding uprights, I I, in the feed box, A, and operated from the cutter wheel shaft, B, through the medium of the gearing, E F e G, and K, all arranged substantially in the manner as and for the purpose set forth.

69,265.—PEG CUTTER.—Levi S. Smith (assignor to himself and Joseph V. Winemiller), Gorsuch's Mills, Md.

I claim making the cutting teeth of a peg cutter on two or more plates, to permit of filing or sharpening the teeth when made at different angles on the different plates, substantially as described.

I claim the lugs on the plates, in combination with the plate constructed and arranged substantially as described. I claim making the flouts or cutting edges to incline backward from the sides toward the center, so as to cut the pegs with a drawing cut, and crowd the cutter toward the side of the shoe.

69,266.—CAR COUPLING.—S. H. Smith, Venice Center, N. Y.

I claim the lock piece, C, the weight pieces, F F, and the crank shaft, D, arranged and combined substantially as described, in combination with the link, B, and the draw head of a railroad car, for the purposes set forth.

69,267.—MEANS FOR EXTINGUISHING FIRE ON STEAMSHIPS.—D. Spooner, Lowell, Ohio.

I claim the steam fire extinguisher above described consisting of the pipe, A, having several outlet cocks, a e f g, the steam drum, C, the throttle valve, H, and the short pipe, B, when used for the purpose and constructed in the manner specified.

69,268.—STEAM GENERATOR BLOWER.—William H. Squires, New York City.

I claim the arrangement of the boiler, A, furnace, B, chamber, C, steam pipe, D, stop cock, G, and conical chamber, E, as herein set forth for the purpose specified.

69,269.—SAFETY REIN.—Ira Stanbery, St. Louis, Mo.

I claim, 1st, The attaching of my safety reins to the Kimball Jackson overhead check or any other check back of the top of the horses' head and forward of the water hook as represented for the use and purpose as herein specified and set forth.

2d, The passing of the lines or safety reins as attached through my elevated turret or dee on my double harness and through the subdivisions of the "turrets" or "dees" on my single harness, for the use and purpose as specified and herein set forth.

3d, The small "turret" or "dee" elevated above the water hook with or without division post, o, and the subdivisions, o e, in the dees, F F, for lines or single harness all for my safety reins or any other safety reins, for the use and purpose as specified and herein set forth.

4th, The combination of my attachment of my safety reins to the checks at B and E, passing them through elevated turret, E, or subdivided turrets, F F, to the driver's hands by inclosing them within the driving reins, thus using "the line within a line" for the use and purpose as specified and herein set forth.

69,270.—THIRD SEAT FOR CARRIAGES.—Austin E. Thayer, Plymouth, Conn., assignor to M. B. Bryant, Brooklyn, N. Y.

I claim the seat, B, provided with a hinged leg, C, and hinged to the seat, A, and constructed in the manner described so as to be folded beneath the seat, A, as herein set forth.

69,271.—MACHINE FOR NICKING SCREW CAPS.—C. E. Thompson and William Walker, New Haven, Conn.

We claim the combination of the revolving center, a b, and spring, c, with the sliding center, B, and punch, i, when they are constructed, arranged and fitted to pronuce the result, substantially as herein described and set forth.

69,272.—LUNCH BOX.—James S. Tibbals, Milford, Conn.

I claim the vessels, A and D, constructed and arranged the one within the other, the pail, D, being suspended by the hooks, d, and trunnions, f, and provided with a cover so as to form a space entirely around the inner vessel and so that the said inner vessel may be removed as described and the outer vessel provided with a bail, B, the whole constructed and arranged in the manner described.

69,273.—METHOD OF ATTACHING HORSES TO CARRIAGES.—William H. Townsend, Camden, Ohio.

1st, I claim the clasp, d, in combination with framework, h, and pin, c, substantially as and for the purpose described.

2d, The clasp, d, provided at its outer end with strap, m, and at its inner end with back bands, k, in manner and for purpose set forth.

69,274.—COTTON BALE TIE.—James W. Truman, Macon, Ga.

I claim the flexible tie, A, constructed as described its ends, a a, extending the entire width of one side over lapping each other and forming a side of double thickness, their points, d, turned at right angles with the sides, a, the latter adapted to be pressed together by the strap, B, as herein shown and described for the purpose specified.

69,275.—APPARATUS FOR AGING AND REFINING WINES AND LIQUORS.—Reuben D. Turner, New York City.

1st, I claim the process substantially as herein described of treating wine or other liquor in *vacuo* and under the influence of heat by agitating it in a distributed form so as to convert it into spray, and afterward circulating the same in a more compact or liquid state in thin layers or streams, essentially as and for the purpose or purposes herein set forth.

2d, The combination with the vacuum chamber, C, of one or more perforated vessels, B, having perforated receiving distributors at or near their top and agitators operating within them, substantially as specified.

3d, In combination with the vacuum chamber, C, and vessel or vessels, B, having agitators operating within them, of a series of reversely inclined trays or surface distributors arranged for operation in connection with the agitators, essentially as herein set forth.

69,276.—FOLDING CHAIR.—Charles S. Twitchell (assignor to James G. English and Edwin F. Mersick), New Haven, Conn.

I claim a folding chair in which the back is hinged to the front legs, as described and connected with the front part of the chair by a band which whether it constitute the seat or not forms the means whereby the back is maintained upright when the chair is unfolded.

69,277.—MACHINE FOR POUNCING HATS.—P. W. Vail, Newark, N. J.

I claim the arrangement of the pouncing rollers, G and G', supporting beds, H H', and feed rollers, I I, all being made adjustable, substantially as and for the purpose specified.

69,278.—REFRIGERATORS.—Peter A. Vogt, Buffalo, N. Y.

What I claim as my invention is the refrigerating air chamber, D, provided with eduction apertures, g g, when so arranged under the ice box and combined with the drip and induction air pipe, F, and final escape passage, it that the air entering the refrigerator will pass directly into the said air chamber through the drip pipe and thence into the food compartment, without coming in contact with the ice, substantially in the manner and for the purposes set forth.

69,279.—ANIMAL TRAP.—Silas Ward, Richmond, Ill.

I claim the combination of the pivoted platforms, B, connecting bars, D, pivoted doors, C, connecting rod, G, lever, E, connecting rod, H, and weight, J, with each other and with the compartments of the trap substantially as herein shown and described.

69,280.—MACHINE FOR MAKING NEEDLES.—C. P. S. Wardwell, Lake Village, N. H.

1st, I claim the reciprocating table, H, constructed as described, operating with other mechanism to feed the wire forward to punch the eyes of the needles, to slab the ends, to determine the forms of the barbs, and to cut the needles from the wires, substantially as herein specified.

2d, I also claim the wedge clamp, Y, constructed arranged and operated substantially as and for the purpose herein specified.

3d, I also claim the guide or guides, 18, on the top of the bed block, N, operating substantially as and for the purpose herein specified.

4th, I also claim the spring presser plate or plates, r r, arranged and operating in combination with the cutting off blades, and eye punches substantially as and for the purposes herein specified.

5th, I also claim the deflector, or deflectors, 15, operating in combination with the reciprocating bed block, N, and eye punch or punches arranged substantially as and for the purpose herein set forth.

6th, I also claim the combined arrangement of the bed block, N, adjusted obliquely to the line of its motion reciprocating table, H, and cutters, s s, adjustable toward and from the table substantially as and for the purpose herein specified.

7th, I also claim the mechanism substantially as herein specified for raising the cutters out of action and returning and retaining them in position for action substantially as herein set forth.

69,281.—MACHINERY FOR MAKING NEEDLES.—C. P. S. Wardwell, Lake Village, N. H.

I claim the mechanism herein described, arranged and operating substantially as set forth for the purpose of raising the cutters out of action, and returning and retaining them in action, successively as herein specified.

69,282.—MACHINE FOR QUARRYING STONE.—G. J. Wardwell, Rutland, Vt.

I claim arranging the steam boiler, the steam engine, the feeding mechanism, and the channeling devices, all upon a single carriage, B, substantially as described.

69,283.—MACHINE FOR QUARRYING STONE.—G. J. Wardwell, Rutland, Vt.

1st, I claim the toothed rails, a a1, and the spur wheels, s2 arranged outside of the carriage, B, in combination with devices which control the feed and operate the chisels, substantially as described and shown.

2d, The combination of the chisel carrying stocks, I, feed shaft, C, and engine gears, E, substantially in the manner and for the purpose described.

3d, The combination reversible saw, h, vibrating arm, g1, feed wheel, g, friction brake, chisel carrying stocks, I, racks, a a1, and pinions, s2, substantially in the manner and for the purpose described.

4th, The adjustable weight, S, applied to the brake rod, S1, in combination with the feeding mechanism and with the chisel carrying stocks, substantially as and for the purpose described.

5th, The chisel carrying stocks, either sectional or solid, stepped on their lower ends and constructed so as to receive removable chisels, substantially as described and shown.

6th, The friction brake applied to a stone channelling machine, in the manner substantially as described.

7th, Communicating a rectilinear reciprocating motion to a chisel stock of a stone channeling machine by means of vibrating segmental levers, H, cams f f, and flexible connections, c' c,' substantially as described.

8th, The combination of reversible standard guides, J J,' with yoke, K3, hinged bar, K4, and the oscillating box, K2, substantially as described.

9th, The arrangement of the balance wheel, F, upon the crank shaft, E, on the inside of the carriage, B, substantially as described.

10th, The arrangement of the engine shaft, E, and feed shaft, C, upon the carriage, B, at intermediate points between the fire box, G,' and the standard guides, J J,' substantially as described.

69,284.—EYELETING MACHINE FOR ATTACHING BUTTONS TO GARMENTS.—Ezra J. Warner, Newark, N. J.

I claim the combination of the sliding bar, h, the die, n, the sliding guide, d, and the plunger, C, all arranged and operating substantially as and for the purposes herein described.

69,285.—CLAMP FOR SCHOOL BOOKS.—W. C. Watson, Paterson, N. J.

I claim the combination of the tightening nut, c, and screw, b', with the roller handle, B, frame, A, and binding cord, C, substantially as and for the purpose specified.

69,286.—MACHINE FOR MAKING WAGON WHEELS.—Francis J. Weber, Carey, Ohio.

I clrim the combination of perforated rod, e, and key, r, with the staff, n, and its gage pin, t, substantially in the manner and for the purposes described.

69,287.—REVERSIBLE BUTT HINGE.—W. S. Weed, Auburn, N. Y.

I claim the combination of the convertible stock pieces, A and A', with the joint pieces, B and C, and wing pieces, E and D, when all are constructed, operated and used substantially in the manner and for the purpose above specified.

69,288.—CLOTHES PIN.—W. H. Wells and Joseph Hawse, Newport Center, Vt.

We claim the clothes pin constructed as described having its ends, b, bent at right angles to the body, to receive the rollers, C, which press against each other beneath the clothes line, the latter being placed at D, between the arms, a a, as herein shown and described.

69,289.—MARKER, HEMMER, ETC., FOR SEWING MACHINES.—Joseph P. White, Savannah, Ga.

1st, I claim the combination of the adjustable gage, B B', with the adjustable presser, C, both made and operating substantially as herein shown and described.

2d, The gage, B B', and presser, C, in combination with the adjustable plate, d, and marker, E, all made and operating substantially as and for the purpose herein shown and described.

3d, The above in combination with the adjustable hammer, F, when made as described.

69,290.—HARROW TEETH.—F. R. Willson, Columbas, Ohio.

I claim making a harrow tooth of a single steel plate split part of the way across with independent wings, a a, placed one ahead of the other, substantially as shown and described.

69,291.—SECURING WHIP SOCKETS TO CARRIAGES.—Frederick Wood, Bridgeport, Conn.

I claim the herein-described clasp for securing whip sockets constructed so as to be attached and united in the manner set forth, as an improved article of manufacture.

69,292.—CALIPER AND DIVIDER.—Edward Wright, Worcester, Mass.

1st, I claim the combination with the arms or legs or a pair of calipers or dividers of the spring, B, substantially as and for the purposes set forth.

2d, The combination with the arms or legs of a pair of calipers or dividers of the swiveled eyes, C C', thumb screw, D, and spring, B, substantially as and for the purposes set forth.

69,293.—STRETCHER FOR HOSIERY.—Sylvester J. Wright, Ellsworth, N. Y.

I claim an improved stretcher for drying hose, formed by the combination of the parts, A B and C, with each other, substantially in the manner herein shown and described.

69,294.—WATER WHEEL.—L. D. Wynkoop, Owasso, Mich.

I claim the upper wheel, D, consisting of a hollow cylinder, a, provided with buckets, f, at its inner side and bottom, in combination with the chute, C, and lower wheel, F, all arranged to operate in the manner substantially as and for the purpose set forth.

69,295.—BAG FASTENER.—Wm. Zeller, Lebanon County, and R. Lechner, Berks County, Pa. Antedated Sept. 18, 1867.

We claim the conical-threaded button, C, when used in combination with the tapering strap, A, in the manner and for the purposes set forth.

69,296.—CORN PLANTER.—Edwin L. Bergstresser, Hublersburgh, Pa.

1st, I claim the feed wheel provided with sectional feeders, each giving a different number of grains and a quantity of plaster corresponding to the amount of corn dropped, constructed and operated substantially as described.

2d, The shifting sections provided with circular rises or ribs fitting into corresponding grooves in the bottom of the box.

3d, The circular grooved lid or top incasing the sections and to which the hopper is attached, constructed and applied substantially as described.

4th, The slotted lever having uprights in the bar operated by means of the movable pin, so that it can be used for each section, substantially as described.

5th, The slotted or perforated arms or ears on each section, for shifting the sections and affording an attachment for the end of the pitman, as described.

6th, The V-shaped bottom or division under the sections, in connection with the slide or cut-off, operating as described.

69,297.—PAVEMENT.—C. W. Stafford, Saybrook, Conn. Antedated May 16, 1867.

1st, I claim wooden paving blocks secured together in sections by double dovetailed strips or double headed keys, B, inserted in their sides, substantially as set forth.

2d, I claim the stringers, F, arranged transversely of the street, in combination with sectional paving blocks, substantially as and for the purpose set forth.

3d, I claim wooden paving blocks connected in sections and grooved transversely, as described and for the purposes set forth.

DESIGNS.

2,782.—SOLDIERS' MEMORIAL.—John T. Harrison, Canton, O.

2,783, 2,787, 2,788, and 2,789.—CARPET PATTERN.—Chas. T. Meyer, Bergen, N. J., assignor to Edward C. Sampson, New York city. Four Patents.

2,784.—TRADE MARK.—Francis Whittaker, St. Louis, Mo.

2,785.—CARPET PATTERN.—Robert Hoskin.—Brooklyn, N.Y.

2,786.—TRADE MARK.—J. G. Mackintosh, New York city.

2,790.—STOVE PLATE.—Isaac A. Sheppard, Philadelphia, Pa.

2,791.—PRINTING TYPE.—Richard Smith, Philadelphia, Pa., assignor to McKellar Smith and Jordan.

NOTE.—The above list contains FIFTY-NINE Patents obtained through the Home Office of the SCIENTIFIC AMERICAN, exclusive of a large number through our Washington Branch.—EDS.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

67,530.—TUBE CUTTER.—Henry Getty, Brooklyn, N. Y. Dated Aug. 6, 1867. Application for reissue received and filed Sept. 16, 1867. Div. A.

I claim a tube cutter in which the cutting edge employed is inclined or angular, substantially as and for the purposes specified.

67,530.—TUBE CUTTER.—Henry Getty, Brooklyn, N. Y. Dated Aug. 6, 1867. Application for reissue received and filed Sept. 16, 1867. Div. B.

1st, I claim a tube cutter in which two rollers are employed to sustain the pipe in the groove between them while being operated upon by a cutter substantially as set forth.

2d, I claim the head, A, with its block, d, that passes between the slides, C, and is operated upon by the screw, D, substantially as and for the purposes set forth

3d, I claim the V-shaped cutter, B, in combination with a pair of cylindrical rollers, E E, substantially as and for the purposes set forth.

4th, I claim the V-shaped cutter, B, in combination with a pair of cylindrical rollers, E E, block, d, slide, C, and screw, D, substantially as set forth.

40,409.—HEEL STIFFENER OR COUNTER FOR BOOTS AND SHOES.—John Ashton Green, Brooklyn, N. Y., assignee by mesne assignments of Daniel E. Hayward. Dated Oct. 27, 1863. Application for reissue received and filed Feb. 12, 1867. Div. A.

As a new article of manufacture I claim a heel stiffener or counter of india-rubber and its compounds which is shaped and vulcanized in the mold in which it is formed and made as set forth, for the purpose described.

2d, As a new article of manufacture I claim for the heels of boots and shoes a stiffening made of india-rubber mixed with ground rags or other suitable fibrous material in molds, substantially as set forth and for the purpose described.

40,409.—HEEL STIFFENER OR COUNTER FOR BOOTS AND SHOES.—John Ashton Green, Brooklyn, N. Y., assignee by mesne assignments of Daniel E. Hayward. Dated Oct. 27, 1863. Application for reissue received and filed Sept. 16, 1867. Div. B.

What is claimed as the invention of the said Hayward as a new article of manufacture is a heel stiffener or counter of india-rubber and its compounds which is shaped and vulcanized in the mold in which it is formed and made as set forth, for the purpose described.

63,057.—BRICK MACHINE.—Peter H. Kells, Adrain, Mich. Dated March 19, 1867. Application for reissue received and filed Sept. 18, 1867.

1st, I claim the combination of the annular mold bed, B, and the central hub or support, C, substantially as described and represented.

2d, The wedge-shaped cut-off, d, arranged and employed in the manner and for the purpose explained.

3d, The arrangement upon the mold wheel of the two pug mills on opposite portions, substantially as described.

4th, An annular mold wheel provided with cogs or gear teeth upon its periphery and mounted upon a central hub or support, substantially as and for the purpose set forth.

62,678.—DIE FOR MAKING BELLS.—Andrew Patterson, Birmingham, Pa. Dated March 5, 1867. Application for reissue received and filed Sept. 12, 1867.

1st, I claim making seamless concave bells of single sheets of wrought or rolled steel by forming or shaping the metal between dies while sufficiently heated to give an increasing thickness of metal at or toward the mouth of the bell, substantially as above described.

2d, Wrought steel seamless concave bells, as a new article of manufacture.

25,689.—OYSTER DREDGE.—Thomas P. Sink, Fairton, N. J. Dated Oct. 4, 1859. Application for reissue received and filed Sept. 16, 1867.

1st, I claim a horizontal roller, E, arranged to turn in bearings on the gunwale of a vessel in combination with a chock, or its equivalent, for retaining the hauling rope on or near the roller, all substantially as set forth.

2d, The combination of the horizontal roller, F, and a vertical roller or a compound chock, A, substantially as set forth.

3d, The arrangement and combination substantially as described of the chock or block, A, its pulleys, B, and the roller, E, for the purpose specified.

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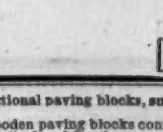
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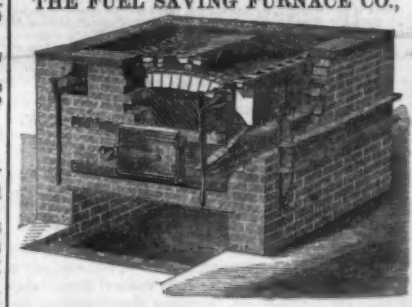

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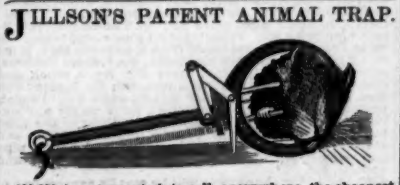

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